REVISION OF THE CHALCID-FLIES OF THE TRIBE CHALCIDINI IN AMERICA NORTH OF MEXICO

BY

BARNARD DE WITT BURKS

B. A., University of Illinois, 1933

M. A., University of Illinois, 1934

A DIGEST OF A THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN ENTOMOLOGY IN THE GRADUATE SCHOOL OF THE UNIVERSITY OF ILLINOIS, 1937

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REVISION OF THE CHALCID-FLIES OF THE TRIBE CHALCIDINI IN AMERICA NORTH OF MEXICO

By B. D. Burks

The tribe Chalcidini includes a relatively large number of the more conspicuous Nearctic chalcidoids, most of which have long been included in the genus *Smicra*. All the species in this tribe are referable to the section "Abdomine Petiolato" of the genus *Chalcis*[1] of Fabricius. The tribe Chalcidini as here limited is equivalent to the genus *Chalcis* as defined by Westwood.[2] Most authors have treated the group as the genus *Smicra* or *Smiera*. As Gahan and Fagan[3] showed that *Smicra* (*Smiera*) Spinola and *Chalcis* Fabricius were isogenotypic, the genus formerly called *Smicra* took the name *Chalcis* instead, and the species that had long been placed in the latter genus were referred to *Brachymeria*. In 1904 Ashmead[4] formulated the tribe Smicrini and included in it, along with *Smicra*, a large number of genera. With the change in the name of its type genus, it becomes necessary likewise to change the name of the tribe Smicrini to Chalcidini, the Chalcidini of Ashmead becoming Brachymerini. The tribe Chalcidini, as treated here, is almost identical with Smicrini Ashmead.

METHODS

In this paper, wherever possible, the comparative terms in general use in insect morphology have been used instead of the more or less conventional taxonomic terminology.

[1] Systema piezatorum, p. 150, 1804.
[2] An introduction to the modern classification of insects, vol. 2, p. 65, 1840.
[3] U. S. Nat. Mus. Bull. 124, p. 133, 1923.
[4] Mem. Carnegie Mus., vol. 1, p. 250, 1904.

The structures mentioned in the following keys and descriptions may be located by referring to figures 6, 7, *a*, 10, *b*, and 13, *b*. Figure 6 shows those structures visible from the lateral aspect of the entire body, figure 7, *a*, the structures and areas visible from the anterior aspect of the head, and figure 10, *b*, the sclerites and areas of the dorsum of the thorax. Figure 13, *b*, is the posterior aspect of a propodeum and shows the location of the spiracles on that segment. These spiracles are somewhat difficult to locate on many specimens.

In order to see the characters used in the keys and descriptions in this paper, it is necessary to use a microscope providing magnifications of 50 to 100 diameters and a very strong light. All measurements used have been made with a disk micrometer. Definite measurements in millimeters are not usable in the Chalcidini, because of the wide range in size of specimens to be encountered within a species. Comparative measurements of two structures on the same specimen are, however, fairly reliable. Several hundred measurements made on specimens of two of the commonest species, *Spilochalcis mariae* (Riley) and *S. side* (Walker), indicate that variations of 10 to 15 percent in these comparative measurements are to be expected. The measurements given in the following descriptions are, therefore, stated in terms that seem broad enough to encompass the actual or probable variation. In the descriptions the term "slightly" is used where structures are visibly not the same size, but measurements have shown them to differ by less than 10 percent.

FIGURE 6.—*Chalcis sispes* (Linnaeus): Lateral aspect.

Ax—axilla
C—costal vein
CE—compound eye
Cer—cercus
Cl—clypeus
Cu—cubital vein
Ep—epipygium
FGS—frontogenal suture
Fl—flagellum
Hy—hypopygium
M—medial vein
MC—mesocoxa
Md—mandible
MEp—mesoepimeron
MEps—mesoepisternum
MF—mesofemur
MPs—mesopraescutum
Ms—mesoscutum
MSc—mesoscutellum
MtC—metacoxa
MtEps—metepisternum
MtF—metafemur
MtN—metanotum
MtT—metatrochanter
MtTi—metatibia
MtW—hindwing
Mv—marginal vein
Mw—forewing
Oc—ocellus
P—pedicel
Pa—parapsidal furrow
PMv—postmarginal vein
Pn—pronotum
Pr—propodeum
PrP—prepectus
Pt—petiole
r-m—radio-medial cross vein
RS—ring segment
Rs—radial sector vein
Rs$_1$—anterior branch of radial sector vein
Sc—subcostal vein
Sca—antennal scape
Sh—ovipositor sheath
SMv—submarginal vein
Sp—tibial spur
St—stigmal vein
Str—strigilis
Tg—tegula

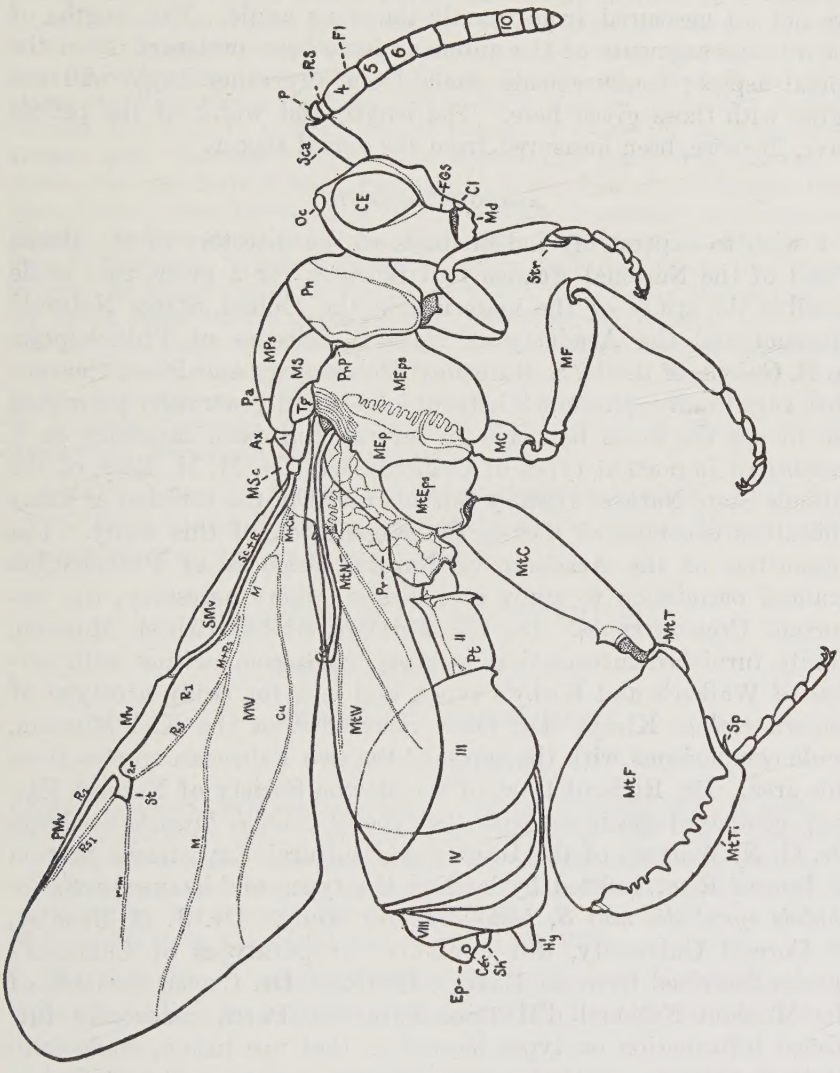

FIGURE 6.—See p. 238 for explanation.

The measurements of the width of the malar space, the interocular space, and the height of the compound eyes have been uniformly made from the anterior aspect. It is obviously necessary to measure all specimens from the same angle, as none of the areas to be measured is flat; the width of the compound eye varies widely if specimens are not all measured from exactly the same angle. The lengths of the various segments of the antennae have been measured from the dorsal aspect; measurements made from any other angle will not agree with those given here. The length and width of the petiole have, likewise, been measured from the dorsal aspect.

ACKNOWLEDGMENTS

I wish to express my indebtedness to the directors of the Bache Fund of the National Academy of Sciences for a grant that made possible the study of the materials in the United States National Museum and the Academy of Natural Sciences of Philadelphia. A. B. Gahan, of the U. S. Bureau of Entomology and Plant Quarantine, very kindly gave much helpful advice and generously permitted me to use the notes he made in several European museums on a number of important types of Chalcididae. Dr. H. H. Ross, of the Illinois State Natural History Survey, aided in the solution of many difficulties encountered during the preparation of this study. The authorities of the Academy of Natural Sciences of Philadelphia granted permission to study and dissect, where necessary, the important Cresson types. Dr. Ch. Ferrière, of the British Museum, kindly furnished information on types, made comparisons with several of Walker's and Kirby's types, and lent for study a cotype of *Smicra rufipes* Kirby. Dr. Olaw Schroeder, of the Kiel Museum, made comparisons with the types of the two Fabrician species from this area. Dr. Richard Dow, of the Boston Society of Natural History, compared specimens with the type of *Chalcis bracata* Sanborn. Dr. G. N. Wolcott, of the Insular Agricultural Experiment Station of Puerto Rico, assisted by lending the types of his species *Spilochalcis syrphidis* and *S. homledrae* for study. Dr. J. C. Bradley, of Cornell University, lent a number of paratypes of Cameron's species described from the Baker collection. Dr. Lucien Berland, of the Muséum National d'Histoire Naturelle, Paris, generously furnished information on types located in that institution, made comparisons with several types, and lent for study cotypes of *Smicra conjungens* Walker and *Conura scutellaris* Sichel.

This revision is based principally on the collection of the United States National Museum. The following individuals and institutions have lent, in addition, over 2,000 specimens:

Academy of Natural Sciences, Philadelphia, Pa.; Prof. Charles P. Alexander, Massachusetts State College, Amherst, Mass.; American Museum of Natural History, New York City; Prof. R. H. Beamer, University of Kansas, Lawrence, Kans.; T. E. Birkett, University of Missouri, Columbia, Mo.; Boston Society of Natural History, Boston, Mass.; Prof. J. Chester Bradley, Cornell University, Ithaca, N. Y.; C. Walter Collins, Dutch Elm Disease Laboratory, Morristown, N. J.; Dr. Derrill M. Daniel, New York Agricultural Experiment Station, Geneva, N. Y.; Deutsches Entomologisches Institut, Berlin-Dahlem, Germany; Department of Entomology, University of Illinois, Urbana, Ill.; Prof. E. O. Essig, University of California, Berkeley, Calif.; Field Museum of Natural History, Chicago, Ill.; Prof. C. L. Fluke, Jr., University of Wisconsin, Madison, Wis.; Dwight Isely, University of Arkansas, Fayetteville, Ark.; Prof. Maurice T. James, Colorado State College, Fort Collins, Colo.; Prof. H. H. Knight, Iowa State College, Ames, Iowa; Dr. J. H. McDunnough, Department of Agriculture, Ottawa, Ontario; Dr. C. E. Mickel, University of Minnesota, St. Paul, Minn.; Prof. R. H. Painter, Kansas Agricultural College, Manhattan, Kans.; Dr. William Procter, Biological Survey of the Mount Desert Region, Bar Harbor, Maine; Dr. H. H. Ross, Illinois State Natural History Survey, Urbana, Ill.; C. W. Sabrosky, Michigan State College, East Lansing, Mich.; Prof. H. A. Scullen, Oregon State Agricultural College, Corvallis, Oreg.; Prof. H. C. Severin, South Dakota State College, Brookings, S. Dak.; S. A. Shaw, Hampton, N. H.; Prof. W. E. Shull, University of Idaho, Moscow, Idaho; and J. R. Watson, Florida Agricultural Experiment Station, Gainesville, Fla.

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Superfamily CHALCIDOIDEA

Family CHALCIDIDAE

Subfamily CHALCIDINAE

Tribe CHALCIDINI

Chalcis FABRICIUS, Mantissa insectorum . . . , vol. 1, p. 272, 1787 (in part).

Smicrini ASHMEAD, Mem. Carnegie Mus., vol. 1, p. 248, 1904.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 18, 1909.—HANDLIRSCH, *in* Schröder's Handbuch der Entomologie, vol. 3, p. 771, 1925; *in* Kükenthal's Handbuch der Zoologie, vol. 4, p. 976, 1933.

Smicrinariae MANI, Rec. Indian Mus., vol. 37, p. 251, 1935.

The following characters will differentiate the members of the tribe Chalcidini from all other members of the superfamily Chalcidoidea:

Antennae 13-segmented, inserted approximately in center of frons, usually considerably dorsad of ventral margins of compound eyes, but occasionally at level of ventral margins (fig. 7, *a*, *e*, *f*), never inserted near clypeal suture (as in fig. 7, *d*); vertex not produced anteriorly in form of two hornlike projections (as in fig. 7, *b*, *c*); tegulae not extended anteriorly to, or almost to, posterior margins of

pronotum, as in *Leucospis* (fig. 10, *a*); forewings always with a distinct cell indicated posterior to marginal vein (fig. 6), never with an isolated fragment of base of $M+Cu_1$ preserved in wing, as in *Leucospis* (fig. 10, *g*); hindwing always with three hamuli (except in some species of the *nigricornis* group of *Spilochalcis*); metacoxae enlarged, long, round in cross section; metafemora enlarged, provided with more than one tooth on outer ventral margin (figs. 11, *h–k;* 12); metatibiae completely arcuate and provided with only one apical spur (fig. 11, *h*), never incompletely arcuate and provided with two apical spurs, as in *Haltichella* (fig. 11, *g*); propodeum provided with a pair of slitlike spiracles (fig. 13, *b*); abdomen distinctly petiolate, petiole always with a basal lamina (fig. 13, *d–j*), never sessile; petiole arising from apex of propodeum, never far up near apex of mesoscutellum; cerci reduced to a pair of disk-shaped setigerous sclerites, which are placed well in from posterior margin of epipygium (fig. 13, *f–j*), never distinctly produced and articulated at base, as in *Podagrion* (fig. 14, *h*); male genitalia (fig. 14, *o*) composed of an outer membranous sheath, a sclerotized inner sheath (*Sh*), a pair of toothed sagittae (*Sag*), and a pair of apically fused penis valves (*Oe*).

KEY TO GENERA OF CHALCIDINI

1. Female, ninth sternite concealed, antennal scape narrow 2
   Male, ninth sternite exposed, antennal scape broad 6
2. Hypopygium produced posteriorly to or beyond apex of abdomen, ovipositor arising near apex (fig. 13, *f, g, j*) 3
   Hypopygium absent or very indistinct, ovipositor arising far forward (fig. 13, *d, h, i*) 4
3. Metafemora with three or four large, slightly curved teeth (fig. 11, *k*); anterior dorsal margin of pronotum with a lamina extending completely across ..... Metadontia
   All metafemoral teeth, except basal one, small, none curved (fig. 11, *i, j*); anterior dorsal margin of pronotum acarinate mesally ..... Chalcis
4. Abdominal petiole long, slender, three-fourths or more length of metacoxa 5
   Petiole short, usually stout, always only one-half or less length of metacoxa ..... Spilochalcis
5. Parapsidal furrows distinct, apex of mesoscutellum without projections ..... Ceratosmicra
   Parapsidal furrows obliterated, apex of mesoscutellum with two prominent, upturned projections ..... Xanthomelanus
6. Claws of protarsi bifid at apices (fig. 11, *a–f*), ninth sternite of abdomen emarginate at apex (fig. 14, *a–g*) ..... Chalcis
   Claws of protarsi simple, ninth sternite entire or very obscurely emarginate 7
7. Petiole long and slender, always more than four-fifths length of metacoxa 8
   Petiole always less than two-thirds length of metacoxa 9

8. Parapsidal furrows distinct, apex of mesoscutellum without projections ..... Ceratosmicra
   Parapsidal furrows obliterated, apex of mesoscutellum with two prominent, upturned projections ..... Xanthomelanus
9. Procoxae, from lateral aspect, longer than wide, metafemora with five or six long, slightly curved teeth (fig. 11, *k*) ..... Metadontia
   Procoxae, from lateral aspect, as long as wide or wider than long, metafemora usually with no long, curved teeth, sometimes with three (fig. 12, *a–k*) ..... Spilochalcis

The genus *Xanthomelanus* has not, so far, been found to have any representatives in America north of Mexico, but it is quite likely that some will eventually be found here. The genus has, therefore been included. This generic key will probably not serve for the segregation of Neotropical material, as I have made no intensive effort to discover generic characters in the available extralimital material.

Genus CHALCIS Fabricius

Chalcis Fabricius, Mantissa insectorum . . ., vol. 1, p. 272, 1787 (in part).—Hübner, Der Naturforscher, vol. 24, p. 54, 1789.—Roemer, Genera insectorum, p. 59, 1789.—Gmelin, Systema naturae, ed. 13, vol. 1, pt. 5, p. 2742, 1790.—Olivier, Encyclopédie méthodique, vol. 5, p. 437, 1790.—Rossi, Mantissa insectorum, p. 126, 1792.—Panzer, Faunae insectorum Germaniae initia, vol. 22, p. 6, 1794.—Lamarck, Système des animaux sans vertèbres, p. 266, 1801.—Latreille, Histoire naturelle . . . des insectes, vol. 3, p. 311, 1802.—Walckenaer, Faune Parisienne, Insectes, vol. 2, p. 77, 1802.—Fabricius, Systema piezatorum, p. 149, 1804.—Latreille, Histoire naturelle . . . des insectes, vol. 13, p. 219, 1805.—Jurine, Nouvelle méthode de classer les hyménoptères et les diptères, p. 312, 1807.—Latreille, Genera crustaceorum et insectorum, vol. 4, p. 25, 1809; Considérations générales . . . des insectes, pp. 303, 436, 1810.—Nees ab Esenbeck, Hymenopterorum ichneumonibus affinium monographiae . . ., vol. 2, p. 20, 1834.—Westwood, An introduction to the modern classification of insects, p. 65, 1840.—Duméril, Mém. Acad. Sci. Inst. France, vol. 31, p. 957, 1860.—Packard, Guide to the study of insects . . ., p. 203, 1872.—Gahan and Fagan, U. S. Nat. Mus. Bull. 124, p. 31, 1923. (Genotype *Sphex myrifex* Sulzer [=*Chrysis sispes* Fabricius].)

Smiera Spinola, Ann. Mus. Hist. Nat., vol. 17, p. 147, 1811 (in part).—Curtis, British entomology, vol. 3, p. 472, 1833.—Walker, Ent. Mag., vol. 2, p. 20, 1835.—Taschenberg, Die Hymenopteren Deutschlands . . ., p. 111, 1866.

Smicra Spinola, Mag. Zool., vol. 7, p. 180, 1837 (in part).—Agassiz, Nomenclator zoologicus, p. 30, 1846.—Förster, Hymenopterologische Studien, vol. 2, p. 30, 1856.—Taschenberg, Die Hymenopteren Deutschlands . . ., p. 95, 1866.—Walker, Notes on Chalcidiae, p. 40, 1871.—Cresson, Trans. Amer. Ent. Soc., vol. 4, p. 35, 1872.—Van Vollenhoven, Pinacographia, p. 47, 1880.—Cameron, Biologia Centrali-Americana, Hymenoptera, vol. 1, p. 78, 1883.—Girard, Traité élémentaire d'entomologie . . ., vol. 3, p. 37, 1885.

Smicra Spinola (*sensu stricto*), Thomson, Hymenoptera Scandinaviae, vol. 4, p. 13, 1875.—Kirby, Journ. Linn. Soc. London, Zool., vol. 17, p. 54, 1883.—Howard, Ent. Amer., vol. 1, p. 215, 1885.—Provancher, Additions et corrections à la faune hyménopterologique . . . Canada, p. 189, 1887.—Cresson, Synopsis of the families and genera of the Hymenoptera of America north of

Mexico, p. 67, 1887.—Ashmead, Ent. Amer., vol. 4, p. 87, 1888.—Dalla Torre, Catalogus hymenopterorum . . ., vol. 5, p. 372, 1898.—Ashmead, Mem. Carnegie Mus., vol. 1, p. 250, 1904.—Kieffer, Berliner Ent. Zeitschr., vol. 49, p. 245, 1905.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 30, 1909.—Viereck, Connecticut Geol. and Nat. Hist. Surv. Bull. 22, p. 526, 1916.

Description.—Legs and venter of body densely covered with short, hydrofuge pubescence, dorsum with longer, more scattered pubescence; punctation coarse; antennae 13-segmented, inserted approximately in center of frons; female flagellum slightly enlarged toward apex, male flagellum uniform in size throughout, fourth antennal segment always longer than any following segments; eyes relatively small, width of malar space usually one-half or more height of compound eye; head transverse when viewed from dorsal aspect; right mandible always with three teeth, left with two or three teeth, dorsal one always largest and longest; protarsal claws of male bifid at apex and provided with several large spines on basal enlargement, claws of female elongate, simple at apex, but usually with teeth or spines at base; prepectus often completely concealed, when visible, discernible as a narrow, tonguelike sclerite projecting between lateral margin of mesoscutum and mesopleuron; metacoxae long, slender, without a smooth asetose area on dorsal surface; forewing with cell R_1 narrow (fig. 6); gaster of abdomen globose, third abdominal segment usually occupying almost half length of gaster; ovipositor normally held nearly upright, arising near posterior end of abdomen; female with hypopygium conspicuously exserted (fig. 13, *f*, *g*); ninth sternite of male slightly excavated in mesal area and emarginate at apex (fig. 14, *a–g*).

Remarks.—The species of *Chalcis* are, where known, parasites of the larvae of Stratiomyiidae and are to be taken only in cattail bogs and other such marshy habitats. *Chalcis* is typically northern in distribution, but a few specimens referable to this genus have been collected from mountainous localities in the subtropical and tropical areas.

Henneguy [5] describes and figures the egg and three stages in the embryological development of the European species *Chalcis sispes* (Linnaeus). The egg of this species differs from that of most chalcidoids in having a stalk at each end, rather than only at one end. Bischoff [6] states that the eggs of *Chalcis* are deposited in the egg masses of their stratiomyiid hosts. Hart [7] has published some observations on the habits of some species of *Chalcis* in America. He observed the adults apparently feeding on stratiomyiid eggs and reared two species from their larvae.

[5] Les insectes, pp. 314, 337, 1904.
[6] Biologie der Hymenopteren, p. 423, 1927.
[7] Illinois State Lab. Nat. Hist. Bull. 4, p. 253, 1894.

KEY TO SPECIES OF CHALCIS

1. Female, hypopygium exserted (fig. 13, *f*, *g*), antennal scape slender ---- 2
   Male, ninth sternite emarginate (fig. 14, *a–g*), antennal scape broadened ---- 10
2. Metafemur with outer basal tooth much larger and longer than following teeth (fig. 11, *j*) ---- 3
   Metafemur with outer basal tooth little if any larger than following teeth (fig. 11, *i*) ---- 5
3. Dorsum of thorax entirely black ---- megalomis (p. 250)
   Dorsum of thorax with yellow markings ---- 4
4. Dorsum of pronotum with a yellow band extending completely across posterior margin; body sparsely setose ---- divisa (p. 246)
   Dorsum of pronotum with two yellow spots near lateral margins; body densely covered with long, white setae ---- lasia (p. 248)
5. Apex of hypopygium isolated from eighth tergite (fig. 13, *g*) ---- 6
   Apex of hypopygium not isolated from eighth tergite (fig. 13, *f*) ---- 8
6. Inner tooth of metafemur lacking ---- flebilis (p. 254)
   Inner tooth of metafemur present, large, acute ---- 7
7. Petiole conspicuously rugose over entire surface; outer surface of metafemur brown or black with yellow or tan markings ---- neptis (p. 251)
   Petiole reticulated only near base; outer surface of metafemur uniformly brown ---- barbara (p. 255)
8. Dorsal surface of petiole densely covered by short, irregular carinae ---- canadensis (p. 258)
   Dorsal surface of petiole glabrous, or nearly so; carinae, if present, located only laterad on petiole ---- 9
9. Petiole with lateral carinae; mesotibia with strong apical spur. microgaster (p. 259)
   Petiole without lateral carinae; mesotibial spur extremely minute ---- phoenicapoda (p. 257)
10. Petiole yellow ---- 11
    Petiole brown or black ---- 12
11. Setae of body short; posterior carina of head extended dorsad only one-half distance from base of mandible to dorsal angle of head (fig. 7, *h*) ---- divisa (p. 246)
    Body densely covered with conspicuous, long, white setae; posterior carina of head extended to dorsal angle of head (fig. 7, *i*) ---- lasia (p. 248)
12. Petiole conspicuously rugose, ventral surface with a strong longitudinal, mesal carina ---- neptis (p. 251)
    Petiole without a mesal carina on ventral surface ---- 13
13. Inner tooth of metafemur large, acute; frontogenal suture strongly angled ---- barbara (p. 255)
    Inner tooth of metafemur minute and obscure or lacking entirely; frontogenal suture straight or lacking ---- 14
14. Antennal scape spatulate (fig. 8, *d*) ---- flebilis (p. 254)
    Antennal scape not spatulate ---- 15
15. Antennal scape expanded near base (fig. 8, *f*) ---- canadensis (p. 258)
    Antennal scape nearly uniform in width throughout (fig. 8, *g*). microgaster (p. 259)

CHALCIS DIVISA (Walker)

FIGURES 7, *h*; 8, *a*; 14, *a*

Smiera divisa WALKER, Journ. Ent., vol. 1, p. 178, 1861.

Smiera divisa (Walker) WALKER, Notes on Chalcidiae, p. 51, 1871.—CRESSON, Trans. Amer. Ent. Soc., vol. 4, p. 55, 1872.—CAMERON, Biologia Centrali-Americana, Hymenoptera, vol. 1, p. 96, 1884.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 34, 1885.—DALLA TORRE, Catalogus hymenopterorum . . ., vol. 5, p. 376, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 34, 1909.

This species is most readily recognized in the female by the transverse yellow stripe at the posterior margin of the dorsum of the pronotum and by the large basal tooth of the metafemur; the male is recognized by its long, slender, yellow petiole and the wide malar space.

Description.—Black with yellow markings; frons, except small area dorsad of clypeus, posterior dorsal margin of pronotum, tegulae, usually apices of profemora and mesofemora, posterolateral angles of mesoscutellum, base and angled dorsal and apical stripe of metafemora, basal half of metatibia, and petiole, yellow; most of anterior and mesolegs, apices of metacoxae, disk and apex of metafemora, and gaster, reddish brown.

Female: 7–8 mm. Antennae inserted ventrad of center of frons, scape exceeding level of posterior ocelli by one-quarter its length, pedicel one-third and ring segment one-sixth length of segment 4, segment 13 minute; margin of scrobe cavity acarinate laterad, strong transverse carinae present in scrobe cavity just ventral to anterior ocellus; interantennal projection with a distinct mesal carina; width of malar space three-fifths height of compound eye; frontogenal suture obsolete; combined widths of compound eyes two-thirds interocular space at level of antennal bases; posterior carina of head extending from base of mandible to middle of posterior margin of compound eye (fig. 7, *h*); head, viewed from dorsal aspect, strongly transverse with compound eyes protruding.

FIGURE 7.—Heads of Chalcidini.

a, *Spilochalcis xanthostigma* (Dalman): Anterior aspect. (*AT*, anterior tentorial pit; *CE*, compound eye; *Cl*, clypeus; *FGS*, frontogenal suture; *FP*, frontal tentorial pit; *IP*, interantennal projection; *MS*, malar space; *Oc*, ocellus; *SC*, scrobe cavity; *W*, interocellar space; *X*, width of compound eye; *Y*, height of compound eye; *Z*, interocular space.)

b, *c*, *Dirhinus texanus* (Ashmead): *b*, Dorsal aspect; *c*, lateral aspect.

d, *Haltichella* sp.: Anterior aspect.

e, *Spilochalcis flavopicta* (Cresson): Anterior aspect.

f, *j*, *Spilochalcis femorata* (Fabricius): *f*, Anterior aspect; *j*, lateral aspect.

g, *Spilochalcis juxta* (Cresson): Lateral aspect.

h, *Chalcis divisa* (Walker): Lateral aspect.

i, *Chalcis lasia*, new species: Lateral aspect.

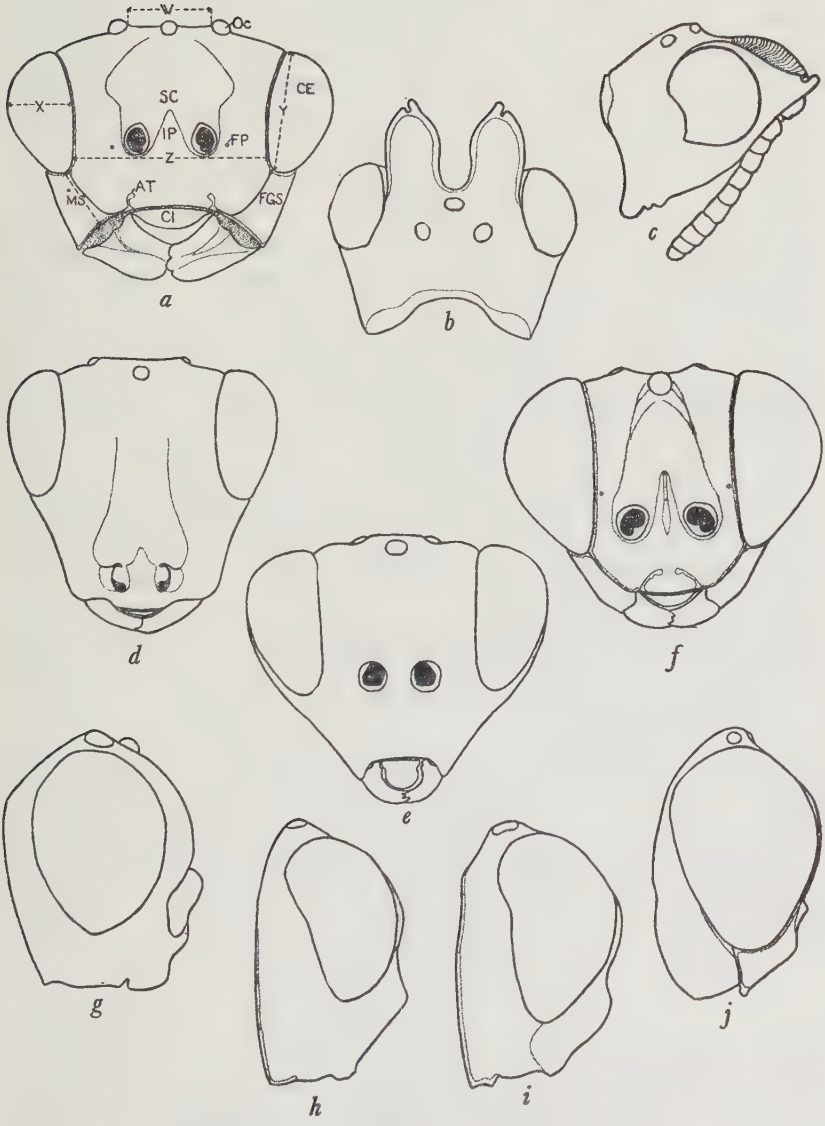

FIGURE 7.—See opposite page for explanation.

Anterolateral and sublateral angles of pronotum slightly produced, vaguely carinate; pubescence fine, inconspicuous, all setae of uniform length; prepectus extremely narrow, sometimes entirely concealed; apex of mesoscutellum provided with a narrow, mesally depressed lamina; outer basal tooth of metafemur large (as in fig. 11, *j*), followed by six to eight smaller teeth, apical two or three indistinctly divided; inner tooth absent; apex of metatibia very slender and acute, long, almost reaching trochanter when tibia is folded against femur.

Propodeum coarsely and irregularly carinate, large, lateral teeth projecting on each side of point of insertion of petiole, spiracular openings vertical; petiole glabrous, twice as long as wide, a pair of minute lateral, subbasal projections usually present; gaster usually equal in length to metafemur, abdominal segments 4 to 7 densely covered with lateral setae; eighth tergite densely setose; cerci round, located near posterior margin of epipygium; apex of ovipositor sheath provided with a few long, ventral setae; apex of hypopygium isolated from eighth tergite (as in fig. 13, *g*).

Male: 6.5 mm. Antennal scape broadened from base to apex (fig. 8, *a*); outer basal tooth of metafemur no longer than following ones; petiole three times as long as wide; gaster slightly shorter than metafemur; ninth sternite shallowly excavated on meson (fig. 14, *a*).

Type locality.—Mexico.

Types.—Lectotype, male, British Museum; lectoallotype, female, British Museum; comparisons made by Dr. Ch. Ferrière. The abdomen and hindlegs are missing from the female type.

Host.—Unknown.

Distribution.—Arizona: Grand Canyon, July 10, 1892, 1 female; July 27, 1 male. Kansas: McPherson County, July 1, 1934, C. W. Sabrosky, 1 female. Oklahoma: Reagan, June 2, 1937, H. H. Ross, 5 females, 3 males. Oregon: Breitenbush Hot Springs, July 2, 1934, H. A. Scullen, 1 male. Mexico: Matamoros, August 12, 1903, W. L. Tower, 1 female.

CHALCIS LASIA, new species

Figures 7, *i*; 8, *b*; 11, *a*; 14, *b*, *o*

This species is closely allied to *Chalcis divisa* (Walker) but is most readily distinguished by these characters: Body elongate, narrow, conspicuously covered with long, white setae of various lengths, posterior carina of head extended from base of mandible to posterodorsal angle of head, apical lamina of mesoscutellum not depressed on meson.

Description.—Black with yellow markings, setae white; frons laterad of scrobe cavity, anterior and mesolegs, lateral triangular spots on dorsum of pronotum, two lateral spots on mesoscutellum, in fe-

male two small areas at posterolateral angles of mesopraescutum, wide basal, dorsal, and subapical areas on outer surface of metafemur, basal and ventral stripe on metatibia, petiole, and transverse dorsal spot on male third abdominal segment, yellow; disk and apex of outer surface of metafemur brown or black.

Female: 8 mm. Antennae inserted ventrad of center of frons, scape exceeding level of posterior ocelli, pedicel one-third, ring segment one-tenth length of segment 4, flagellar segments somewhat variable and asymmetrical, segment 5 usually two-thirds length of 4, last three segments indistinctly divided; scrobe cavity deep, surface provided with strong transverse carinae; interantennal projection with a small, irregular anterior carina; frons densely covered with long, white pubescence; surface provided with irregular punctures and minute carinae; width of malar space one-half height of compound eye, frontogenal suture obsolete; combined widths of compound eyes three-quarters width of interocular space at level of antennal bases; left mandible with two blunt teeth, dorsal one much larger, right mandible with three teeth, dorsal one acute, two ventral ones blunt.

Dorsum of thorax deeply and densely punctured, punctures somewhat shallower on mesoscutum, pubescence very long and dense; anterolateral angles of pronotum carinate, anterior dorsal margin acarinate on mesal two-thirds; parapsidal grooves obscure; apical spur of mesotibia small; apex of mesoscutellum with a narrow lamina, which is not depressed on meson; metafemur densely covered by minute setae, outer ventral margin with 11 to 14 small, widely spaced teeth, basal tooth larger than others; inner tooth minute, located near trochanter; apex of mesotibia acute, variable in length.

Propodeum covered with strong, irregular carinae; two basolateral areas minutely reticulated, almost smooth; spiracular openings slightly oblique; no lateral propodeal teeth present; petiole glabrous, two and one-half times as long as wide, lateral carinae present on basal one-third of petiole; gaster slightly shorter than metafemur; abdominal segments 3 to 7 with long lateral setae; eighth tergite obscurely punctured and lightly shagreened; cerci oval, located near anterior margin of ninth tergite; apex of hypopygium isolated from eighth tergite.

Male: 7 mm. Antennal scape expanded (fig. 8, *b*); frontogenal suture extending parallel with dorsal margin of clypeus for two-thirds its length, then sharply curved toward compound eye (fig. 7, *i*); combined widths of compound eyes equal to interocular space at level of antennal bases; protarsal claw (fig. 11, *a*) with many long, comblike teeth; basal tooth of metafemur not larger than others; petiole three and one-half times as long as wide; ninth sternite (fig. 14, *b*) slightly excavated on meson.

Type locality.—California.

Types.—Holotype, female, Mojave, Calif., April 26, 1936, E. G. Linsley; allotype, male, Tehachapi, Calif., August 3, 1897, C. F. Baker; paratypes, California, 2 males, southern California, 1 male. Holotype and allotype deposited in the U. S. National Museum, paratypes in the Academy of Natural Sciences of Philadelphia.

Host.—Unknown.

CHALCIS MEGALOMIS, new species

FIGURE 11, *j*

This species is closely related to *Chalcis divisa* (Walker) but is most readily distinguished by the wider malar space, shorter petiole, and the completely black dorsum of the thorax.

Description.—Black; two small spots on frons near bases of antennae, base of metafemur, and petiole, yellow; protibiae and mesotibiae and all tarsi, wings, and gaster, brown.

Female: 5–8 mm. Antennae inserted slightly ventrad of center of frons, scape exceeding, by one-fourth its length, level of posterior ocelli, ring segment less than one-half length of pedicel, segment 4 one-eighth longer than 5, segments 5 to 7 equal, following ones shorter, except 13, which equals length of 7; a series of parallel transverse ridges present in scrobe cavity just ventral to anterior ocellus; a prominent transverse carina present on frons just ventrad of antennal bases; malar space two-thirds height of compound eye; frontogenal suture obliterated; left mandible with one large acute dorsal tooth and one blunt ventral tooth, right mandible with three nearly equal rounded teeth; diameter of posterior ocellus slightly less than one-half width of interocellar space.

Dorsum of thorax covered by fine, decumbent pubescence, setae dense at posterolateral angles of pronotum; punctation coarse, deep; parapsidal grooves distinct; prepectus narrow, extending almost to tegula; mesotibial spur small; apex of mesoscutellum provided with a narrow, mesally emarginate lamina; metacoxae very slightly flattened on outer dorsal side at apex, pubescence dense, short; metafemur densely covered by short pubescence, ventral margin with 10 or 11 teeth, outer basal one three times as large as any others (fig. 11, *j*); inner tooth lacking; apex of metatibia long, sharp; apex of last segment of posterior tarsus with two long dorsal and two shorter lateral setae; claw long, with a very small, blunt inner tooth, basal enlargement without teeth or spines, but with several long setae.

Propodeum conspicuously carinate over entire surface; spiracular openings vertical; petiole glabrous, two-thirds length of metacoxa, a pair of small lateral projections present on each side near base; gaster usually slightly shorter than metafemur; third abdominal

segment with a few dorsal setae, following segments uniformly covered by moderately long setae; cerci oval, located near posterior margin of epipygium; ovipositor sheath with ventral margin straight, apex acutely pointed, a few long apical setae present on ventral side; hypopygium provided with a few long, lateral setae, apex isolated from eighth tergite (as in fig. 13, *g*).

Male: Unknown.

Type locality.—Northern Illinois.

Types.—Holotype, female, Princeton, Ill., July 2, 1936, Burks et al.; paratypes, Princeton, Ill., July 2, 1936, 12 females; Princeton, Ill., July 7, 1934, DeLong and Ross, 1 female; McHenry, Ill., July 27, 1934, DeLong and Ross, 2 females; Boulder, Colo., University Campus, October 2, 1917, Ada Knoale, 1 female. Holotype and 14 paratypes deposited in Illinois State Natural History Survey collection; three paratypes, U. S. National Museum; one paratype, British Museum.

Host.—Unknown.

CHALCIS NEPTIS, new species

FIGURES 8, *c;* 11, *b;* 14, *c*

This species is closely related to *Chalcis divisa* (Walker) but is distinguished by the long, narrow body, the longitudinal mesal depression of the mesopraescutum, and the conspicuously rugose petiole.

Description.—Black; two yellow spots on frons near bases of antennae; anterior and mesolegs brown, with apices of femora and tibiae yellow; wings brown; metafemora brown, usually with base, an oblique dorsal stripe, and a small ventral spot near apex, yellow.

Female: 5–6 mm. Antennae inserted slightly ventrad of center of frons; apex of scape just attaining level of posterior ocelli, ring segment one-half length of pedicel; segment 4 one and one-half times the length of segment 5, segments 5 and 6 equal, following ones slightly shorter and equal in length, suture between 12 and 13 obscure; interantennal projection large, terminating in a carina running halfway up scrobe cavity; width of malar space one-half height of compound eye; frontogenal suture extending ventrally from compound eye for two-thirds its length, then abruptly recurved toward mandible; a carina extends parallel to suture near mandible, then curves obliquely ventrally at point where suture curves: suture and carina enclose a small triangular area at ventral margin of compound eye; left mandible with one large, blunt, dorsal tooth and a smaller, rounded, ventral tooth, right mandible with one sharp dorsal tooth and two blunt ventral ones, ventral teeth slightly curved inward; diameter of posterior ocellus one-third width of interocellar space.

Pronotum with prominent laterodorsal tufts of pubescence; punctation of dorsum of thorax coarse, irregular; parapsidal grooves partly obscured posteriorly; mesopraescutum with longitudinal mesal depression; prepectus visible only as a small triangular sclerite at anterolateral angle of mesoscutum; mesoscutellum slightly emarginate at apex; mesotibial spur minute; metacoxae slender, sparsely covered by long pubescence; outer surface of metafemur densely covered by short pubescence, scattered longer setae present at base and on ventral margin, 14 to 16 teeth present on outer ventral margin, basal one slightly larger; distinct, sharp inner tooth present; apex of metatibia long, sharp; six large apical spines present on posterior tarsus; claw long, basal enlargement with several minute spines.

Propodeum conspicuously carinate, laterobasal areas with carinae directed obliquely from meson, two strong, lateral, subapical carinae present, spiracular opening vertical; petiole twice as long as wide, surface conspicuously covered with irregular dorsal carinae and rugae, two strong lateral carinae present on either side, ventral one becoming obsolete before reaching apex, a row of long, dense setae present at each lateral margin; gaster usually equal in length to metafemur, third abdominal segment glabrous, without setae, following segments covered by short, appressed pubescence; cerci oval, located near anterior margin of epipygium; ovipositor sheath sinuate on ventral margin, apex acutely pointed and provided with a dense tuft of setae, some of which are long and slightly curved; hypopygium strongly exserted, apex isolated from eighth tergite (as in fig. 13, *g*).

FIGURE 8.—Male antennal scapes of Chalcidini.

a, *Chalcis divisa* (Walker): Mesal aspect.
b, *Chalcis lasia*, new species: Mesal aspect.
c, *Chalcis neptis*, new species: Mesal aspect.
d, *Chalcis flebilis* (Cresson): Mesal aspect.
e, *Chalcis barbara* (Cresson): Mesal aspect.
f, *Chalcis canadensis* (Cresson): Mesal aspect.
g, *Chalcis microgaster* Say: Mesal aspect.
h, *Spilochalcis exornata* (Cresson): Mesal aspect.
i, *Spilochalcis eubule* (Cresson): Mesal aspect.
j, *Spilochalcis dorsata* (Cresson): Mesal aspect.
k, *Spilochalcis transitiva* (Walker): Mesal aspect.
l, *m*, *Spilochalcis phoenica*, new species: *l*, Mesal aspect; *m*, anterior aspect.
n, *Spilochalcis nigricornis* (Fabricius): Mesal aspect.
o, *Spilochalcis nortoni* (Cresson): Mesal aspect.
p, *Spilochalcis delicata* (Cresson): Mesal aspect.
q, *Spilochalcis hirtifemora* (Ashmead): Mesal aspect.
r, *Spilochalcis femorata* (Fabricius): Mesal aspect.
s, *Spilochalcis igneoides* (Kirby): Mesal aspect.
t, *Spilochalcis mariae* (Riley): Mesal aspect.

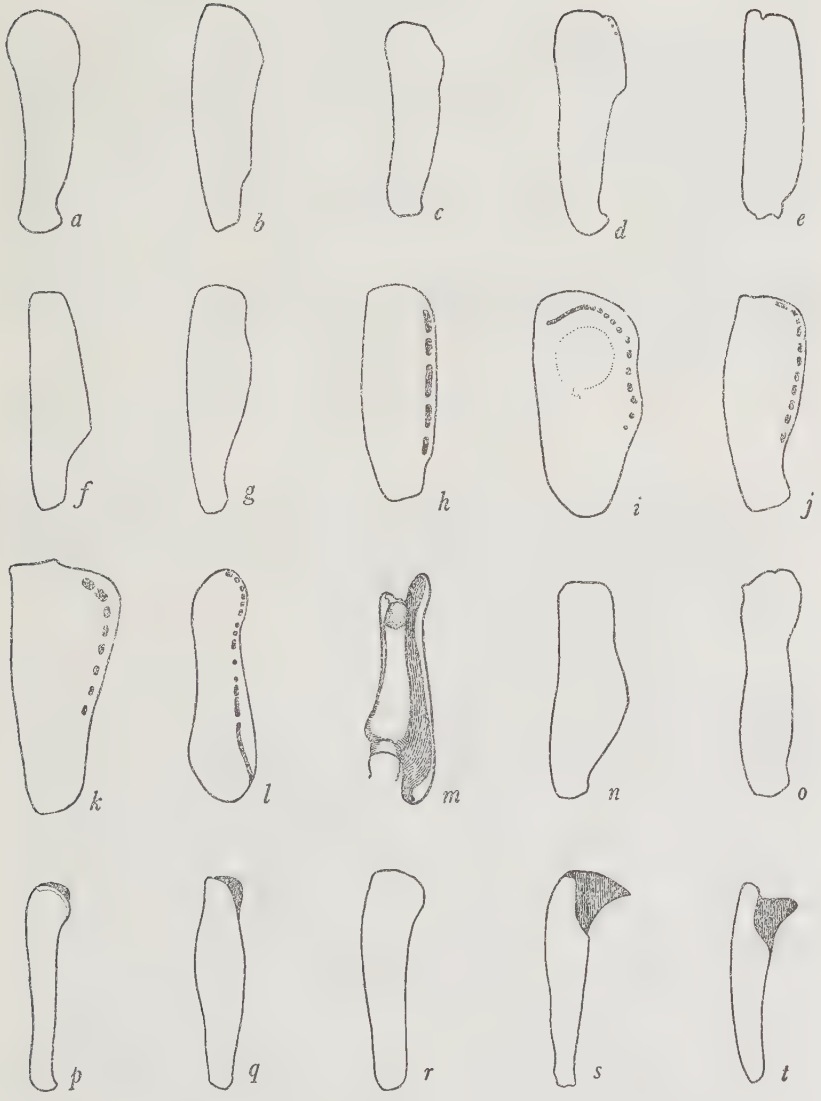

FIGURE 8.—See opposite page for explanation.

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Male: 6 mm. Antennal scape (fig. 8, *c*); compound eyes prominent, projecting; malar space one-fourth height of compound eye; diameter of posterior ocellus one-half width of interocellar space; foretarsal claw (fig. 11, *b*); metafemur with a sharp inner tooth; petiole three times as long as wide; ninth sternite (fig. 14, *c*).

Type locality.—Oregon.

Types.—Holotype, female, Albert Lake, Oreg., July 2, 1935, J. Schuh; allotype, male, Fish Trap Lake, Wash., July 8, J. M. Aldrich; paratypes, Maxwell, N. Mex., 1916, G. W. Barber, 1 female; Albert Lake, Oreg., July 2, 1935, J. Schuh, 1 female; Emery County, Utah, September 12, 1921, Grace O. Wiley, 1 female; Colorado, 1 female. Holotype and allotype deposited in U. S. National Museum; one paratype, Cornell University; one paratype, Illinois State Natural History Survey; one paratype, University of Minnesota; one paratype, American Museum of Natural History.

Host.—Unknown.

CHALCIS FLEBILIS (Cresson)

FIGURES 8, *d;* 11, *c;* 14, *d*

Smicra flebilis CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 35, 39, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 34, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 377, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 35, 1909.—CRESSON, The Cresson types of Hymenoptera, p. 75, 1916.

Spilochalcis flebilis (Cresson) JOHNSON, Biological survey of the Mount Desert region, vol. 1, p. 149, 1927.

The female of this typically northern species is most easily recognized by the conspicuously exserted hypopygium, which is isolated from the eighth tergite and by the metafemur lacking an inner tooth; the male is recognized at once by the spatulate antennal scape.

Description.—Black, the pronotum and mesoscutellum of female occasionally with indistinct yellow spots, legs more or less red, outer surface of metafemur with base and a ventral spot near apex white or light yellow.

Female: 4.5–6 mm. Antennae inserted in center of frons, apex of scape only slightly exceeding level of posterior ocelli, segment 4 one-third longer than 5; malar space slightly more than one-half height of compound eye; frontogenal suture slightly curved, almost straight; left mandible with one large dorsal and one very small ventral tooth, right mandible with three teeth, two ventral ones small, blunt and only indistinctly divided, dorsal tooth acute.

Prepectus narrow, apex not quite reaching tegula; mesotibial spur minute; outer surface of metafemur densely covered with short, fine pubescence, outer ventral margin with 12 to 16 minute teeth; basal

tooth only slightly larger than others; inner tooth absent; apex of metatibia elongate, sharp; apex of posterior tarsus with five to seven long setae; claws long, basal enlargement with one or two minute teeth.

Propodeum thickly covered by small carinae, spiracular openings vertical; petiole short, only slightly more than twice as long as wide, surface usually roughly ridged at base, a pair of small lateral subbasal projections present; cerci round, located midway between anterior and posterior margins of epipygium; apex of ovipositor sheath constricted and provided with several long, slightly curved ventral setae; hypopygium strongly exserted, isolated from eighth tergite (as in fig. 13, *g*).

Male: 4–5.5 mm. Antennal scape spatulate (fig. 8, *d*); apical spur of mesotibia well developed; foretarsal claw with a series of long basal spines (fig. 11, *c*); metafemur without an inner tooth; ninth sternite narrowly emarginate at apex (fig. 14, *d*).

Type locality.—Massachusetts.

Type.—Holotype, male, 1778, Academy of Natural Sciences of Philadelphia.

Host.—Unknown.

Distribution.—Connecticut, Illinois, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, Ontario.

CHALCIS BARBARA (Cresson)

FIGURES 8, *e;* 11, *d;* 13, *g;* 14, *e*

Smicra barbara CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 37, 47, 192, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 33, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 373, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 34, 1909.—CRESSON, The Cresson types of Hymenoptera, p. 74, 1916.

Smicra rufofemorata CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 36, 39, 191, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 35, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 234, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 381, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 36, 1909.—CRESSON, The Cresson types of Hymenoptera, p. 76, 1916.—VIERECK, Connecticut Geol. and Nat. Hist. Surv. Bull. 22, p. 526, 1916.—BRITTON, *ibid.*, vol. 31, p. 326, 1920.

The female of this species is most readily recognized by the usually red dorsum of the thorax, the large acute inner tooth of the metafemur, and the conspicuously exserted hypopygium with the apex isolated from the eighth tergite; the male is always black, with the antennal scape uniformly expanded from base to apex, and the metafemur has a distinct inner tooth.

Description.—Dorsum of female more or less red, of male black; legs uniformly brown; abdomen varying from brown to black.

Female: 5–7.5 mm. Antennae inserted slightly ventrad of center of frons, apex of scape slightly exceeding level of posterior ocelli; malar space one-half height of compound eye; frontogenal suture extending ventrad from compound eye for one-half its length, then deflected sharply toward mandible; left mandible with one large blunt tooth and one minute acute ventral one, right mandible with three blunt teeth, dorsal one largest.

Prepectus narrow, bladelike, extending to tegula; mesotibial spur minute; outer surface of metafemur densely covered with long pubescence on ventral side, femoral teeth partly concealed by pubescence, outer ventral margin with 16 to 20 small teeth, basal one slightly larger than others; inner tooth large; apex of metatibia elongate, sharp; apex of posterior tarsus with three or four long spines; claw short and with several minute teeth on basal enlargement.

Propodeum provided with coarse reticulations, two laterobasal areas sometimes almost glabrous, spiracular openings vertical; petiole twice as long as wide, surface faintly reticulated, dorsal surface reticulated near base, distinct lateral carinae present; gaster usually shorter than metafemur; cerci oval, located midway between posterior and anterior margins of epipygium; ovipositor sheath flattened, ventral margin acute, apex acute and provided with a dense tuft of short setae; hypopygium strongly exserted, apex isolated from eighth tergite (fig. 13, *g*).

Male: 5–7 mm. Antennal scape (fig. 8, *e*); foretarsal claw with several long, comblike teeth on basal enlargement (fig. 11, *d*); metafemur with distinct inner tooth; ninth sternite broadly excavated on meson (fig. 14, *e*).

Type locality.—Texas.

Types.—Holotype, female, 1790.1, Academy of Natural Sciences of Philadelphia; paratypes, 1790.2, Academy of Natural Sciences of Philadelphia, 1651, U. S. National Museum, 2 females. The male was described as *Smicra rufofemorata* Cresson from Texas; types A.N.S.P. No. 1779 and U.S.N.M. No. 1657.

The species *Smicra barbara* Cresson was originally stated to be described from a male, but the types are females. As red female specimens agreeing with these types are uniformly found associated with black male specimens agreeing with the type of *rufofemorata* Cresson, they are undoubtedly the sexes of the same species.

Host.—Odontomyia sp. (Diptera, Stratiomyiidae).

Distribution.—Colorado, Illinois, Kansas, Minnesota, New Hampshire, New Jersey, North Dakota, Texas, Wyoming.

CHALCIS PHOENICAPODA, new name

Smicra rufipes KIRBY, Journ. Linn. Soc. London, Zool., vol. 17, p. 70, 1883.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 234, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 381, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 36, 1909.

The placing of this species in the genus *Chalcis* makes it a secondary homonym of *Chalcis rufipes* Olivier [8]; a new name is therefore necessary.

This species is closely related to *Chalcis canadensis* (Cresson) but differs in that the left mandible has three, rather than two, teeth, and the petiole is three times as long as wide, completely glabrous dorsad, and lacks lateral carinae.

Description.—Black, with red-brown legs.

Female: 6.5 mm. Antennae inserted slightly ventrad of center of frons, apex of scape slightly exceeding level of posterior ocelli, segment 4 of antenna one and one-half times length of 5, segments 5 to 8 equal in length, 9 and 10 slightly shorter, 11 to 13 combined equal in length to 4; width of malar space one-half height of compound eye; frontogenal suture slightly curved, almost straight; combined widths of compound eyes three-fourths interocular space at level of antennal bases; left mandible with three blunt teeth, dorsal one largest.

Dorsum of thorax uniformly covered with deep pits; anterolateral angles of pronotum acute, anterior dorsal margin acarinate; prepectus bladelike, extending to tegula; apex of mesoscutellum provided with a minute, mesally depressed lamina; metacoxa glabrous, provided with a few inconspicuous setae; outer surface of metafemur minutely shagreened, ventral margin provided with 13 to 15 minute teeth, the basal one not larger than following teeth; inner tooth large, acute; claws of posterior tarsi elongate, slender, basal enlargement with a few minute teeth.

Propodeum provided with three strong carinae radiating obliquely laterad from meson, basolateral areas minutely reticulated, spaces between carinae glabrous, spiracular slits vertical; petiole three times as long as wide, surface glabrous, lateral carinae lacking, a pair of minute, lateral, subbasal projections present; gaster shorter than metafemur, third abdominal tergite asetose, following tergites provided with long lateral setae; eighth tergite very lightly shagreened and sparsely setose; cerci located near posterior margin of epipygium; hypopygium with apex isolated from eighth tergite.

Male: Unknown.

Type locality.—Georgia.

[8] Encyclopédie méthodique, vol. 5, p. 440, 1790.

Types.—Cotypes, 2 females, British Museum; one cotype kindly lent for study by Dr. Ferrière of that institution.

Host.—Unknown.

Distribution.—GEORGIA: 1 female (cotype). FLORIDA: Jacksonville, 2 females.

CHALCIS CANADENSIS (Cresson)

FIGURES 8, *f*; 11, *e*; 14, *f*

Smicra canadensis CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 35, 39, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 33, 1885.—PROVANCHER, Additions et corrections à la faune hyménopterologique. . . . Canada, p. 189, 1887.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 374, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 34, 1909.—CRESSON, The Cresson types of Hymenoptera, p. 74, 1916.

Smicra microgaster HART, Illinois State Lab. Nat. Hist. Bull. 4, p. 271, 1894 (misidentification).

This species is most readily recognized in the female by the minute mesotibial spur, the short rugose petiole, and the exserted hypopygium with the apex not isolated from the eighth tergite (as in fig. 13, *f*); the male is recognized at once by the basally enlarged antennal scape (fig. 8, *f*).

Description.—Entirely black, or occasionally dark rufous; base of metafemora occasionally tinged with brown.

Female: 5–5.5 mm. Antennae inserted slightly ventrad of center of frons, scape exceeding by one-fifth its length level of posterior ocelli; width of malar space slightly more than one-half height of compound eye; frontogenal suture almost obliterated, occasionally traceable near ventral margin of compound eye, a secondary carina usually extends from base of mandible to genal area posterior to compound eye; left mandible with one large, acute dorsal tooth and one small ventral tooth, right mandible with three equal, acute teeth.

Prepectus narrow, bladelike, slightly broader anteriorly, apex not quite reaching tegula; mesotibial spur minute; outer surface of metafemur densely covered with short pubescence, outer ventral margin with nine to twelve minute teeth, basal one slightly larger than following teeth; inner tooth wanting; apex of metatibia slender, acute; apex of posterior tarsus provided with four to six long setae, claw small, basal enlargement with three minute teeth.

Propodeum completely covered with small reticulations, these rugosities slightly stronger near apex, spiracular openings vertical, slightly constricted in middle; petiole short, less than twice as long as wide, surface provided with coarse, confused carinae, distinct lateral carinae present at base, but usually becoming obsolete before reaching apex; gaster usually slightly longer than metafemur; cerci oval, situated near posterior margin of epipygium; apex of ovipositor sheath produced in a long, acute point, a sparse tuft of setae present;

hypopygium exserted, apex not isolated from eighth tergite (as in fig. 13, *f*).

Male: 4.5–5 mm. Antennal scape expanded at base (fig. 8, *f*); protarsal claw with a few teeth on basal enlargement (fig. 11, *e*); metafemur with pubescence on outer surface extremely short, inner tooth lacking or obscurely indicated; ninth sternite broadly excavated mesad (fig. 14, *f*).

Type locality.—Canada.

Type.—Holotype, female, 1783, Academy of Natural Sciences of Philadelphia.

Hosts.—*Odontomyia vertebrata* Say, *Odontomyia* sp. (Diptera, Stratiomyiidae).

Distribution.—Illinois: 1 male; Algonquin, July 7–17, 1909, Nason, 1 female, 7 males; Havana, June 30, 1897, Hart and Bronson, 3 females, July 3, 1894; ex *Odontomyia vertebrata*, C. A. Hart, 1 male. Michigan: Washtenaw County, June 13–19, 1931, ex *Odontomyia* sp., K. C. Kuster, 2 females, 1 male. New York: Penn Yan, July 19, 1925, Babiy, 1 male. Ontario: Ottawa, 1 female, 1 male.

CHALCIS MICROGASTER Say

Figures 8, *g*; 11, *f*, *i*; 13, *f*; 14, *g*

Chalcis microgaster Say, Long's second expedition . . ., vol. 2, p. 326, 1824.—Cresson, Proc. Ent. Soc. Philadelphia, vol. 1, p. 228, 1862.—Howard, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 36, 1885.

Smicra microgaster (Say) Cresson, Trans. Amer. Ent. Soc., vol. 4, pp. 35, 38, 1872; Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—Provancher, Additions et corrections à la faune hyménopterologique . . . Canada, p. 189, 1887.—Smith, Geol. Surv. New Jersey, Catalogue of insects, p. 18, 1890.—Dalla Torre, Catalogus hymenopterorum, vol. 5, p. 379, 1898.—Smith, Ann. Rept. New Jersey State Board Agr., vol. 27, suppl., p. 554, 1900.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 35, 1909.—Viereck, Connecticut Geol. and Nat. Hist. Surv. Bull. 22, p. 526, 1916.

This species is most easily distinguished in the female by the large mesotibial spur, the long, nearly glabrous petiole, and the exserted hypopygium not isolated from the eighth tergite (fig. 13, *f*); the male is readily identified by its relatively slender antennal scape, and the two acutely projecting points on the posterior margin of the ninth sternite (fig. 14, *g*).

Description.—Black, the anterior and mesolegs variegated with brown, base of metafemur red-brown.

Female: 4–5 mm. Antennae inserted in center of frons, scape exceeding level of posterior ocelli by one-fourth its length; width of malar space slightly less than one-half height of compound eye; frontogenal suture straight, this suture often paralleled ventrally by a rather vague carina; left mandible with two teeth of nearly

equal size, right mandible with acute dorsal tooth and two rounded ventral ones.

Prepectus narrow, bladelike, apex reaching tegula; mesotibial spur large; ventral half of outer surface of metafemur provided with dense, short pubescence, outer ventral margin with 13 to 16 teeth (fig. 11, *i*), basal one and usually fifth to tenth larger than others; distinct inner tooth present; apex of metatibia narrow, acute; apex of posterior tarsus with four long spines, claw small, basal enlargement without teeth, but with several long setae.

Propodeum with two parallel, longitudinal mesal carinae, basolateral areas glabrous or almost so, spiracular openings vertical; petiole three times as long as wide, two-thirds length of metacoxa, surface almost glabrous, lateral carinae usually absent, occasionally present near base, a sparse row of long setae present on either lateral margin; gaster usually slightly longer than metafemur; cerci oval, located near posterior margin of epipygium, a smooth area surrounds each cercus; apex of ovipositor sheath bluntly pointed, provided with a tuft of short setae; hypopygium exserted, apex not isolated from eighth tergite (fig. 13, *f*).

Male: 3.5–4.5 mm. Antennal scape relatively narrow (fig. 8, *g*); protarsal claw with many small basal teeth (fig. 11, *f*); mesotibial spur usually small; metafemur with a small inner tooth; ninth sternite acutely bidentate at apex (fig. 14, *g*).

Type locality.—Pennsylvania.

Types.—Cresson redescribed the male of this species in 1872, but the specimens at present in the Academy of Natural Sciences of Philadelphia labeled "*Smicra microgaster*" are evidently not the ones he had, as they do not agree with his description, and are females. Provancher described the female in 1887; I have not seen his specimens.

Host.—Unknown.

Distribution.—Illinois, Minnesota, Oklahoma, Ohio, Ontario, Pennsylvania, Texas, Wisconsin.

Genus METADONTIA Ashmead

Metadontia Ashmead, Ent. Amer., vol. 4, p. 87, 1888.—Dalla Torre, Catalogus hymenopterorum, vol. 5, p. 394, 1898.—Ashmead, Mem. Carnegie Mus., vol. 1, p. 252, 1904.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 32, 1909.—Gahan and Fagan, U. S. Nat. Mus. Bull. 124, p. 87, 1923. (Genotype, *Chalcis amoena* Say [= *Smicra montana* Ashmead].)

Plagiosmicra Cameron, Invert. Pacifica, vol. 1, p. 56, 1904.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 31, 1909.—Gahan and Fagan, U. S. Nat. Mus. Bull. 124, p. 115, 1923.

Description.—Antennae inserted considerably ventrad of center of frons but dorsad of ventral margins of compound eyes; segments of

flagellum stout, mostly as broad as long, segment 4 always longer than 5; malar space narrow, always only one-third or less height of compound eye; left mandible with two teeth, right with three; pubescence of body long, sparse; procoxae, from lateral aspect, longer than wide; tarsal claws small, simple in both sexes; apical lamina of mesoscutellum very narrow and emarginate on meson; metacoxae semiglobose, outer dorsal surface glabrous; metafemora with several long, slender, slightly curved teeth on outer ventral margin; propodeum, from lateral aspect, strongly declivent, coarsely rugose, entirely without lateral projections; gaster elongate, blunt at apex (fig. 13, *j*); female hypopygium exserted, partly isolated from eighth tergite; ninth sternite of male obscurely emarginate at apex.

The single known species parasitizes pupae of Lycaenidae.

METADONTIA AMOENA (Say)

FIGURES 11, *k*; 13, *j*

Chalcis amoena SAY, Boston Journ. Nat. Hist., vol. 1, p. 271, 1836.—CRESSON, Proc. Ent. Soc. Philadelphia, vol. 1, p. 228, 1862.

Smicra amoena (Say) WALKER, Notes on Chalcidiae, p. 51, 1871.—CRESSON, Trans. Amer. Ent. Soc., vol. 4, p. 58, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 33, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 373, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 34, 1909.

Metadontia amoena (Say) SANDERSON, U. S. Dept. Agr. Bur. Ent. Bull. 56, p. 42, 1906.

Smicra montana ASHMEAD, Trans. Amer. Ent. Soc., vol. 14, p. 183, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 379, 1898.

Metadontia montana (Ashmead) ASHMEAD, Mem. Carnegie Mus., vol. 1, p. 252, 1904.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 46, 1909.—GAHAN and FAGAN, U. S. Nat. Mus. Bull. 124, p. 87, 1923.

Plagiosmicra ashmeadi CAMERON, Invert. Pacifica, vol. 1, p. 56, 1904.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 44, 1909.—GAHAN and FAGAN, U. S. Nat. Mus. Bull. 124, p. 115, 1923.

Octosmicra sp. REINHARD, Texas Agr. Exp. Stat. Bull. 401, p. 33, 1929.

This species is most readily recognized by the broad compact thorax, the completely carinate anterior dorsal margin of the pronotum, and the blunt apex of the abdomen.

Description.—Yellow with black markings; mesal stripe in scrobe cavity, occipital area of head, mesopraescutum usually with two anterior stripes converging to form a single mesal stripe near posterior margin, broad mesal areas of lobes of mesoscutum, anteromesal angles and posterior margins of axillae, longitudinal mesal stripe of mesoscutellum, variable areas of pleurae, ventral apices of metacoxae, metatrochanters usually, dorsal, basoventral, and apical spots on outer surface of metafemora, usually entire propodeum, petiole, and variable transverse dorsal bands of gaster, black.

Female: 6–7.5 mm. Apex of antennal scape just reaching level of posterior ocelli, flagellar segments stout; scrobe cavity deep, margins carinate on ventral half; frons punctate laterally, glabrous or very faintly shagreened mesally ventrad of antennal bases, lateral carinae present parallel with anterior margins of compound eyes; interantennal projection carinate; frontal tentorial pits located dorsolaterad of antennal bases; width of malar space one-third height of compound eye; frontogenal suture straight or very slightly curved; left mandible with two acute teeth, right with three; combined widths of compound eyes equal to interocular space at level of antennal bases.

Dorsum of thorax thickly covered with large punctures, pubescence short, white or yellow; entire anterior dorsal margin of pronotum carinate; prepectus extending to tegula; apex of mesoscutellum with a narrow, mesally depressed lamina; mesotibia with distinct apical spur; metepisternum punctate anteriorly, glabrous near posterior margin, outer dorsal surface of metacoxa slightly flattened, glabrous; outer surface of metafemur glabrous, setae short, sparse, outer ventral margin provided with seven to ten irregular teeth, four or five of which are long, slender, and slightly curved (fig. 11, *k*); inner tooth minute or lacking.

Propodeum covered with confused carinae, spaces between carinae glabrous, spiracular openings vertical, much wider at top than at bottom; petiole glabrous, twice as long as wide, basal flange wide on dorsal and ventral sides and narrow laterad, lateral carinae usually present; gaster slightly longer than metafemur; eighth abdominal tergite minutely pitted, sparsely setose; cerci oval or almost round, located near posterior margin of epipygium; hypopygium exserted, apex not isolated from eighth tergite (fig. 13, *j*).

Male: 4.5–6 mm. Width of malar space one-quarter height of compound eye; combined widths of compound eyes slightly greater than width of interocular space at level of antennal bases; inner tooth of metafemur generally wanting, occasionally faintly indicated; petiole two and one-half to three times as long as wide, lateral carinae obscure or wanting.

Type locality.—Indiana.

Types.—Neotype, female, Arlington, Tex., September 4, 1905, ex *Strymon cecrops*, F. C. Bishopp, deposited in the U. S. National Museum. Synonyms: *montana* Ashmead, U.S.N.M. No. 41397; *ashmeadi* Cameron, British Museum.

The type of *montana* Ashmead differs from what I take for this species only in lacking the anteromesal yellow spot on the mesopraescutum, but such a character is never of specific worth in this group; *ashmeadi* Cameron differs neither in color nor in structure from this species.

Hosts.—*Strymon melinus* (Hübner), *Strymon cecrops* (Fabricius), *Thecla* sp. (Lepidoptera, Lycaenidae).

Distribution.—Arizona, Arkansas, California, District of Columbia, Florida, Georgia, Illinois, Kansas, Missouri, North Carolina, Tennessee, Texas, Virginia.

Guatemala, Nicaragua, Trinidad, B. W. I.

Genus SPILOCHALCIS Thomson

Chalcis Fabricius, Mantissa insectorum . . ., vol. 1, p. 272, 1787 (in part).—Westwood, An introduction to the modern classification of insects, p. 65, 1840.—Packard, Guide to the study of insects . . ., p. 203, 1872.

Smiera Spinola, Ann. Mus. Hist. Nat., vol. 17, p. 147, 1811 (in part).—Walker, Ent. Mag., vol. 2, p. 20, 1835.

Smicra Spinola, Mag. Zool., vol. 7, p. 180, 1837 (in part).—Walker, Notes on Chalcidiae, p. 40, 1871.—Cresson, Trans. Amer. Ent. Soc., vol. 4, p. 35, 1872; Biologia Centrali-Americana, Hymenoptera, vol. 1, p. 78, 1883.

Conura, "*Conurae smicriformes*," "*Conurae chalcidiformes*"[9] Sichel, Ann. Soc. Ent. France, ser. 4, vol. 5, p. 347, 1865.

Phasganophora "*Phasganophorae smicriformes*"[9] Sichel, *ibid.* p. 348.

Spilochalcis Thomson, Hymenoptera Scandinaviae, vol. 4, p. 15, 1875.—Kirby, Journ. Linn. Soc. London, Zool., vol. 17, p. 55, 1883.—Howard, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 3, 1885; Ent. Amer., vol. 1, p. 215, 1886.—Cresson, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 67, 1887.—Ashmead, Ent. Amer., vol. 4, p. 87, 1888.—Dalla Torre, Catalogus hymenopterorum, vol. 5, p. 384, 1898.—Ashmead, Mem. Carnegie Mus., vol. 1, p. 250, 1904.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 30, 1909.—Viereck, Connecticut Geol. and Nat. Hist. Surv. Bull. 22, p. 527, 1916.—Gahan and Fagan, U. S. Nat. Mus. Bull. 124, p. 135, 1923.—Mani, Rec. Indian Mus., vol. 37, p. 251, 1935. (Genotype, *Chalcis xanthostigma* Dalman.)

Spilosmicra Cameron, Trans. Amer. Ent. Soc., vol. 35, p. 422, 1910.

Diplodontia Ashmead, Ent. Amer., vol. 4, p. 87, 1888.—Dalla Torre, Catalogus hymenopterorum, vol 5, p. 394, 1898.—Ashmead, Mem. Carnegie Mus., vol. 1, p. 252, 1904.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 32, 1909.—Gahan and Fagan, U. S. Nat. Mus. Bull. 124, p. 47, 1923.

Eustypiura Ashmead, Mem. Carnegie Mus., vol. 1, p. 251, 1904.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 30, 1909.—Gahan and Fagan, U. S. Nat. Mus. Bull. 124, p. 64, 1923.

Enneasmicra Ashmead, Mem. Carnegie Mus., vol. 1, p. 252, 1904.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 31, 1909.—Gahan and Fagan, U. S. Nat. Mus. Bull. 124, p. 51, 1923.

Octosmicra Ashmead, Mem. Carnegie Mus., vol. 1, p. 252, 1904.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 31, 1909.—Gahan and Fagan, U. S. Nat Mus. Bull. 124, p. 98, 1923.

Heptasmicra Ashmead, Mem. Carnegie Mus., vol. 1, p. 252, 1904.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 31, 1909.—Gahan and Fagan, U. S. Nat. Mus. Bull. 124, p. 70, 1923.

Hexasmicra Ashmead, Mem. Carnegie Mus., vol. 1, p. 252, 1904.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 32, 1909.—Gahan and Fagan, U. S. Nat. Mus. Bull. 124, p. 71, 1923.

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[9] These names have priority over *Spilochalcis* but are not binomial.

Pentasmicra ASHMEAD, Mem. Carnegie Mus., vol. 1, p. 252, 1904.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 32, 1909.—GAHAN and FAGAN, U. S. Nat. Mus. Bull. 124, p. 112, 1923.

Tetrasmicra ASHMEAD, Mem. Carnegie Mus., vol. 1, p. 252, 1904.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 32, 1909.—GAHAN and FAGAN, U. S. Nat. Mus. Bull. 124, p. 143, 1923.

Trismicra ASHMEAD, Mem. Carnegie Mus., vol. 1, p. 252, 1904.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 32, 1909.—GAHAN and FAGAN, U. S. Nat. Mus. Bull. 124, p. 149, 1923.

Description.—Antennae inserted ventrad of center of frons; antennal scape of male more or less broadened, scape of female slender; flagellar segments varying from stout to slender; left mandible typically with two teeth, occasionally with three, right mandible usually with three teeth, although division of two ventral ones may be obscure; anterior dorsal margin of pronotum never completely carinate; mesoscutellum provided with an apical lamina, this lamina, in most species, emarginate on meson; protarsal claws never bifid at apex, basal enlargement with or without small teeth; metatibia with distinct apical spine; metacoxae slightly flattened and asetose on outer dorsal surface; metafemur with 3 to 28 teeth on outer ventral margin; petiole varying from shorter than wide to three and one-half times as long as wide; ovipositor arising far forward, female abdomen always more or less acuminate; ninth sternite of male never emarginate at apex, occasionally slightly excavated on meson.

All the species of this genus that have been reared are parasites of the pupae of Lepidoptera, Coleoptera, Hymenoptera, or, rarely, cyclorrhaphous Diptera. The genotype, the European species *Spilochalcis xanthostigma* (Dalman), was stated by Walker[10] to parasitize a sawfly of the genus *Hylotoma* [=*Arge* of present-day usage].

KEY TO GROUPS OF SPECIES OF SPILOCHALCIS

1. Apex of mesoscutellum bidentate (fig. 10, *e*); both mandibles with only two teeth ..... transitiva group (p. 265)
   Apex of mesoscutellum not bidentate (fig. 10, *b*); right mandible always with three teeth 2
2. Frontogenal suture wanting, clypeus only slightly wider than long (fig. 7, *e*); antennal sockets often on a line with ventral margins of compound eyes ..... side group (p. 326)
   Frontogenal suture present, clypeus always at least twice as wide as long (fig. 7, *a*, *f*); antennal sockets always dorsad of ventral margins of compound eyes 3
3. Antennal scape short, apex never reaching level of ventral margin of anterior ocellus ..... xanthostigma group (p. 307)
   Antennal scape long, apex at least reaching level of vertex, usually markedly exceeding level of vertex 4

[10] Ent. Mag., vol. 3, p. 22, 1835.

4. Metanotum and propodeum uniformly and densely covered with long setae; abdomen strongly compressed_____ nigricornis group (p. 278)
   Metanotum sparsely setose, propodeum usually with only a few setae at lateral margins, disk of propodeum always entirely without setae; abdomen not compressed_____ femorata group (p. 291)

These groupings of species have been made solely for convenience in their treatment. The groups are not sufficiently distinct to be considered as separate genera, for when specimens from the Neotropical area are studied intergrades are to be found between these groups.

The transitiva Group

All the members of the *transitiva* group have distinct lateral carinae on the frons parallel to the anterior margins of the compound eyes; the scrobe cavity is deep and the margins are distinctly carinate; the malar space is quite narrow, one-third or less the height of the compound eye; the metafemora have, with one exception, only four teeth; one species has (see fig. 12, *e*) acquired one or two additional small teeth near the base, and the large apical tooth is rather indistinctly subdivided.

The *transitiva* group includes those members of the genus that may be considered the most primitive. The genus *Spilochalcis* is undoubtedly derived from some ancestral form having slender metafemora. A few large teeth were probably developed first on the ventral margin, and later these large teeth were replaced by a number of smaller ones; at the same time, the femora gradually became much thickened. One species of this group, *S. exornata* (Cresson), has rather slender metafemora and four large teeth (fig. 12, *a*). In other species the gradual increase in width of the metafemur can be seen (fig. 12, *b–d*), and in *S. phoenica* described below and the extralimital species *S. compactilis* (Cresson), the transition to a form with many small teeth can be seen. In these two species the addition of small teeth at the base and the beginning of the subdividing of the large apical tooth have occurred (fig. 12, *e*).

KEY TO SPECIES OF THE TRANSITIVA GROUP

1. Outer basal tooth of metafemur larger and longer than others (fig. 12, *b*)_____ eubule (p. 269)
   Outer basal tooth of metafemur not larger than others_____ 2
2. Metafemur elongate, narrow (fig. 12, *a*)_____ exornata (p. 266)
   Metafemur semiglobose (fig. 12, *c–e*)_____ 3
3. Outer ventral margin of metafemur with only four teeth_____ 4
   Outer ventral margin of metafemur with six or seven teeth, apical ones obscure (fig. 12, *e*)_____ phoenica (p. 276)
4. Outer basal tooth of metafemur small (fig. 12, *c*)_____ dorsata (p. 272)
   Outer basal tooth of metafemur large (fig. 12, *d*)_____ transitiva (p. 274)

SPILOCHALCIS EXORNATA (Cresson)

FIGURES 8, *h;* 12, *a*

Smicra exornata CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 38, 50, 1872.—CAMERON, Biologia Centrali-Americana, Hymenoptera, vol. 1, p. 81, 1884.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 34, 1885.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 376, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 35, 1909.—CRESSON, The Cresson types of Hymenoptera, p. 75, 1916.

This slender yellow-and-black species is most easily recognized by its almost completely glabrous frons and its elongate, slender metafemora, with only four teeth on the outer ventral margin (fig. 12, *a*).

Description.—Yellow or red with black markings; antennal flagellum usually darker toward apex; mesopraescutum with a T-shaped mark, mesal margins of lobes of mesoscutum, axillae on mesal half, mesoscutellum usually with a longitudinal mesal line, and apex, apices of metacoxae, and three spots on metafemur, black.

Female: 6–7 mm. Antennal scape strongly curved near base, apex reaching level of ventral margin of anterior ocellus, pedicel slightly less than one-half length of segment 4, ring segment one-sixth length of 4, segment 4 one-eighth longer than 5, segments 5 to 10 equal, last three segments indistinctly separated, penultimate segment shortest; scrobe cavity with margin feebly carinate; interantennal projection with a thin, anterior lamina; lateral carinae completely encircling compound eyes; frons usually without punctures, sometimes with a

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FIGURE 9.—Male antennal structures of Chalcidini (all mesal aspect).

a, *Spilochalcis clora*, new species: Scape.
b, *Spilochalcis phais*, new species: Scape.
c, *Spilochalcis tanais*, new species: Scape.
d, *Spilochalcis juxta* (Cresson): Scape.
e, *Spilochalcis arcana* (Cresson): Scape.
f, *Spilochalcis lecta* (Cresson): Scape.
g, *Spilochalcis melana*, new species: Scape.
h, *Spilochalcis odontotae* Howard: Scape.
i, *Spilochalcis subobsoleta* (Cresson): Scape.
j, *Spilochalcis pallipes* (Smith): Scape.
k, *Spilochalcis dema*, new species: Scape.
l, *Spilochalcis flavopicta* (Cresson): Scape and pedicel.
m, *Spilochalcis side* (Walker): Scape and pedicel.
n, *Spilochalcis leptis*, new species: Scape and pedicel.
o, *Spilochalcis delumbis* (Cresson): Scape and pedicel.
p, *Ceratosmicra debilis* (Say): Scape.
q, *Ceratosmicra meteori*, new name: Scape.
r, *Ceratosmicra paya*, new species: Scape.
s, *Ceratosmicra immaculata* (Cresson): Scape.
t, *Spilochalcis igneoides* (Kirby): Pedicel, ring segment, and segment 4.
u, *Spilochalcis mariae* (Riley): Pedicel, ring segment, and segment 4.

FIGURE 9.—See opposite page for explanation.

few scattered ones and with a few indistinct oblique carinae ventrad of antennal bases; frontal tentorial pits located at margins of compound eyes, slightly dorsad of level of antennal bases; width of malar space slightly less than one-third height of compound eye; frontogenal suture extending transversely from compound eye to dorsal articulation of mandible; combined widths of compound eyes greater by one-third than width of interocular space at level of antennal bases; diameter of posterior ocellus one-half width of interocellar space.

Dorsum of thorax coarsely pitted, uniformly covered by long yellowish setae; anterolateral angles of pronotum strongly produced; anterior dorsal carina interrupted on mesal one-third; parapsidal furrows partly obliterated; prepectus usually completely hidden by anterior projection of lateral margin of mesoscutum; apex of mesoscutellum strongly bidentate, the projections slightly upturned and a small dorsal carina present on each; metepisternum covered by large, shallow punctures, areas between punctures minutely reticulated; metacoxae glabrous, covered, except on outer dorsal side, by long, fine setae; metafemora (fig. 12, *a*) narrow, glabrous, scatteringly covered by setae of various lengths, outer ventral basal tooth nearly as long as following ones, a minute tooth often present between basal and second tooth; second and third teeth long, narrow, acute, apical tooth large, blunt; inner tooth wanting; metatibia with apical spine long, acutely pointed.

Propodeum with only a few long, lateral setae, and a patch of short setae on each side near base; carinae few, often partly or completely obliterated near base and on disk; one strong roundly blunted lateral tooth present on either side of point of insertion of petiole, spiracular opening slanted obliquely laterad; petiole glabrous, basal lamina present only on ventral and lateral sides, lateral carinae wanting, a few lateral setae present near apex; gaster usually slightly shorter than metafemur; abdominal tergites 3 to 7 with a few scattered lateral setae; eighth tergite faintly reticulated, sparsely covered by long setae; spiracular openings round; cercus obovate, located midway between anterior and posterior margins of epipygium; apex of ovipositor sheath provided with long ventral setae.

Male: 6 mm. Antennal scape (fig. 8, *h*) uniformly broad from base to apex; combined widths of compound eyes equal to interocular space at level of antennal bases; inner tooth of metafemur wanting; gaster usually slightly larger than metafemur.

Type locality.—Mexico.

Types.—Holotype, male, 1817.1; allotype, female, 1817.2; paratypes, 1817.3, 1817.4, 2 males: Academy of Natural Sciences of Philadelphia.

Host.—(?) *Mimorista flavidissimalis* Grote (Lepidoptera, Pyralidae).

Distribution.—Texas: Brownsville, November 21–December 17, 1910, 2 females, 3 males, November 19–25, 1911, 3 females, January 18, 1923, T. C. Barber, 1 female; Uvalde, June 1921, ex *Mimorista flavidissimalis* (?), J. C. Hamlin, 1 female.

Mexico: Sumichrast, 1 female, 1 male (allotype and holotype), 2 males (paratypes).

Honduras: La Ceiba, April 14, 1917, F. J. Dyar, 1 female.

SPILOCHALCIS EUBULE (Cresson)

Figures 8, *i;* 12, *b*

Smiera eubule Cresson, Proc. Ent. Soc. Philadelphia, vol. 4, p. 93, 1865; The Cresson types of Hymenoptera, p. 74, 1916.—Wolcott, Journ. Dept. Agr. Puerto Rico, vol. 7, p. 61, 1924; Journ. Agr. Univ. Puerto Rico, vol. 20, p. 537, 1936.

Smiera eubule (Cresson) Walker, Notes on Chalcidiae, p. 51, 1871.—Cresson, Trans. Amer. Ent. Soc., vol. 4, pp. 37, 49, 1872.—Howard, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 34, 1885.—Dalla Torre, Catalogus hymenopterorum, vol. 5, p. 376, 1898.—Ashmead, Trans. Ent. Soc. London, vol. 48, p. 336, 1900.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 35, 1909.

This large species is most readily distinguished by the very narrow malar space, the antennae inserted low on the frons, but well above the ventral margins of the compound eyes, and the metafemur having only four teeth, the basal one of which is larger than the others.

Description.—Red, light brown, or yellow with dark brown markings; small dorsal spots near lateral margins of pronotum, center of mesopraescutum and mesal margins of lobes of mesoscutum, axillae, mesal stripe and apex of mesoscutellum, apices of metacoxae, dorsal and variable ventral stripes on outer side of metafemora, and most of abdomen, usually dark; apical half of wings slightly darker than basal half.

Female: 8–10 mm. Antennal scape short, stout, markedly expanded at apex, reaching to level of ventral margin of anterior ocellus, pedicel slightly less than one-half length of segment 4, ring segment one-tenth or less length of fourth segment, segment 4 slightly longer than 5, segments 5 to 10 nearly equal, tapering slightly, segment 11 slightly wider at base than 10, 12 and 13 shorter, narrow; scrobe cavity deep, smooth, margin carinate, this margin enclosing anterior ocellus; interantennal projection provided with a large, thin, anterior lamina; frons scatteringly punctured laterad of scrobe cavity, almost glabrous ventrad of antennal bases; anterior tentorial pits located near margin of compound eyes, slightly dorsad of level of antennal bases; lateral carinae present on frons laterad of scrobe cavity; malar space one-eighth height of compound eye; combined

widths of compound eyes slightly greater than interocular width at level of antennal bases; diameter of posterior ocellus two-thirds width of interocellar space.

Dorsum of thorax coarsely punctate, pubescence long, yellow or white; anterior margins or pronotum strongly carinate laterad, anterior dorsal carina narrowly interrupted on meson; prepectus small, not reaching tegula; mesoscutellum with a small mesal notch on anterior margin, apex conspicuously bidentate, these projections sharp, slightly converging; metepisternum strongly punctured, provided with a few scattered setae; metacoxa glabrous, sparsely setose on outer ventral side; metafemur (fig. 12, *b*) glabrous, sparsely setose, outer basal ventral tooth large, second and third teeth long, slender, apical tooth blunt; inner tooth wanting; metatibia with apical spine sharp, narrow, slightly curved.

Propodeum setose, strongly carinate, prominent lateral teeth present at posterolateral angle of propodeum, spiracular openings nearly vertical; petiole short, stout, glabrous, lateral carinae wanting; basal lamina wide on ventral side; gaster slightly longer than metacoxa, abdominal segments 3 to 7 with lateral setae; spiracular openings on eighth tergite large, anterior margins straight; eighth tergite glabrous, without setae; cercus small, nearly round, located midway between anterior and posterior margins of epipygium; ovipositor sheath setose at apex.

Male: 8 mm. Antennal scape broad (fig. 8, *i*), inner tooth of metafemur absent; metatibia with apex usually slightly blunted.

Type locality.—Cuba.

FIGURE 10.—Thoracic structures and wings of Chalcidini.

a, *Leucospis dorsigera* Fabricius: Thorax, lateral aspect. (*MEp*, mesoepimeron; *MEps*, mesoepisternum; *MPs*, mesopraescutum; *MS*, mesoscutum; *MSc*, mesoscutellum; *MtEps*, metepisternum; *MW*, forewing; *Pn*, pronotum; *Pr*, propodeum; *Sp*, spiracle; *Tg*, tegula.)

b, *Spilochalcis tanais*, new species: Thorax, dorsal aspect. (*Ax*, axilla; *Pa*, parapsidal furrow; *Pn*, pronotum; *MPs*, mesopraescutum; *Ms*, mesoscutum; *Msc*, mesoscutellum; *SSC*, scutoscutellar suture; *T*, transscutal suture.)

c, *Spilochalcis apaiis*, new species: Thorax, dorsal aspect.

d, *Ceratosmicra paya*, new species: Thorax, dorsal aspect.

e, *Spilochalcis dorsata* (Cresson): Mesoscutellum, dorsal aspect.

f, *Ceratosmicra meteori*, new name: Thorax, dorsal aspect.

g, *Leucospis affinis* Say: Forewing. (*C*, costal vein; *Cu*, cubital vein; *M*, medial vein; *Mv*, marginal vein; *R*, radial vein; *Rs*, radial sector; Rs_1, anterior branch of radial sector; *Sc*, subcostal vein; *St*, stigmal vein.)

h, *Spilochalcis delicata* (Cresson): Stigmal vein.

i, *Spilochalcis nigricornis* (Fabricius): Hamuli.

j, *Spilochalcis nortoni* (Cresson): Hamuli.

k, *Spilochalcis mariae* (Riley): Stigmal vein.

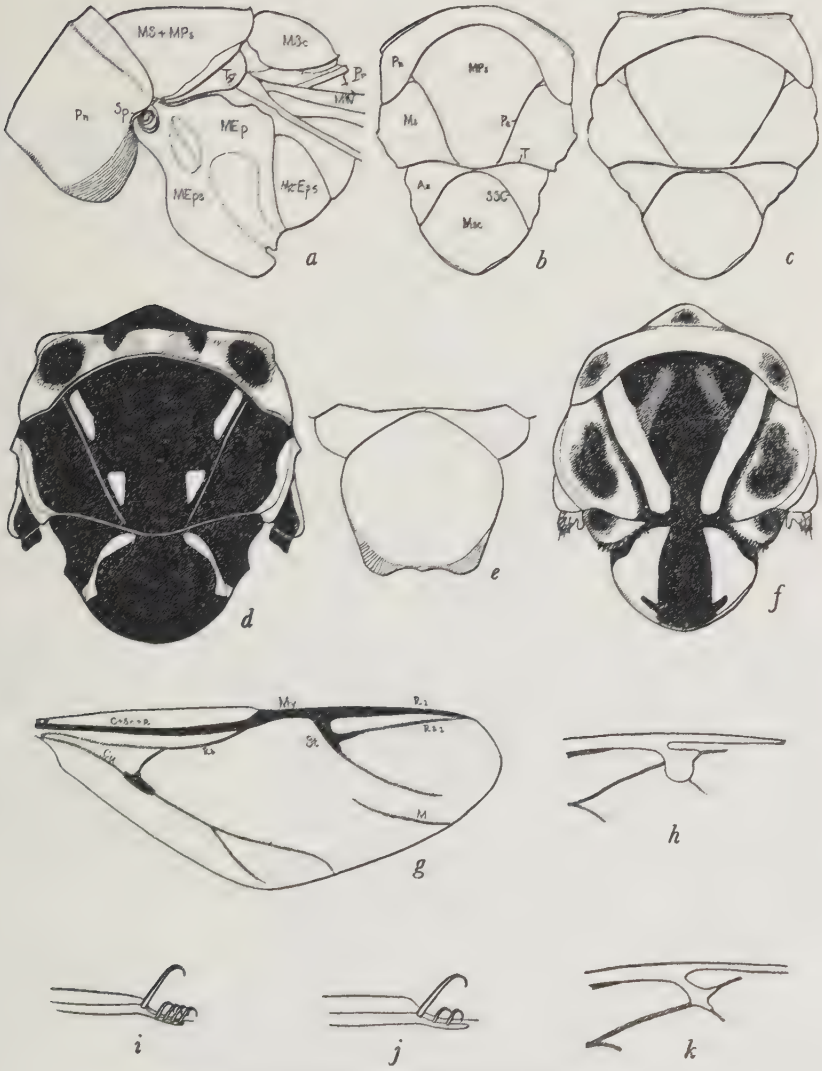

FIGURE 10.—See opposite page for explanation.

Types.—Holotype, female, 1814.1; allotype, male, 1814.2; paratype, 1814.3, 1 female: Academy of Natural Sciences of Philadelphia.

Host—Catopsilia eubule (Linnaeus) (Lepidoptera, Pieridae).

Distribution.—GEORGIA: Bainbridge, July 15, 1919, J. C. Bradley, 1 female; DeWitt, July 22, 1912, M. D. Leonard, 1 female.

CUBA: 134, ex *Catopsilia eubule*, 2 females, 1 male (types); Guantanamo, 1 male.

HAITI: July 5, 1931, M. Kislink, 1 female.

PUERTO RICO: Aibonito, July 14, 1914; 1 female; Arecibo, March 13, 1934, Anderson and Mills, 1 male; Ponce, August 19, 1932, Bofill and Oakley, 1 male; Santa Rita, 1915, 2 females.

SPILOCHALCIS DORSATA (Cresson)

FIGURES 8, *j*; 10, *e*; 12, *c*

Smicra dorsata CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 37, 49, 192, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 34, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 376, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 34, 1909.—CRESSON, The Cresson types of Hymenoptera, p. 74, 1916.

Spilochalcis missouriensis HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, pp. 6, 35, 1885.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 385, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 40, 1909.

Smicra missouriensis (Howard) CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 234, 1887.

This yellow, or red, and black species is most easily recognized by its large compound eyes, the widely spaced apical projections of the mesoscutellum, and the semiglobose metafemora with only four outer ventral teeth, the basal one minute.

Description.—Yellow or red with black markings; mesopraescutum except lateral and posterior margins, mesal margins of lobes of mesoscutum, mesal halves of axillae, anterior margin of mesoscutellum, apices of metacoxae, three small marks on outer side of metafemora, most or all of propodeum, and usually petiole, black; markings of mesopraescutum vary considerably.

Female: 5–6 mm. Apex of antennal scape not quite reaching level of ventral margin of anterior ocellus; pedicel two-fifths and ring segment one-fifth length of segment 4, 5 slightly shorter than 4; segments 5 to 10 equal, 11 slightly shorter, 12 shorter than 11, 13 equal to 11; scrobe cavity deep, marginal carina vague except ventrally; interantennal projection provided with a thin anterior lamina; lateral carinae usually completely encircling compound eyes, sometimes interrupted on vertex; frons scatteringly punctured except dorsad of clypeus; frontal tentorial pits located at margins of compound eyes at level of antennal bases; width of malar space

one-third height of compound eye; frontogenal suture extending transversely from compound eye to dorsal articulation of mandible; combined widths of compound eyes one-half greater than width of interocular space at level of antennal bases; diameter of posterior ocellus one-half interocellar width.

Dorsum of thorax coarsely punctured, anterolateral angles of pronotum strongly carinate, almost laminate, anterior dorsal margin with carina interrupted on mesal one-quarter; parapsidal furrows partly obliterated; prepectus entirely concealed by a hooklike projection of anterodorsal angle of mesoscutum; mesoscutellum bidentate at apex, these projections small, upturned, usually acutely pointed; metepisternum conspicuously pitted, densely covered by long setae; metacoxae glabrous, setose except on outer dorsal side; metafemora (fig. 12, *c*) glabrous, rather sparsely covered by short pubescence, semiglobose, outer ventral basal tooth one-fourth to one-third size of following teeth, second and third teeth long, slender, slightly curved, apical tooth large, blunt; inner tooth wanting; metatibia with apex long, sharp, slightly curved.

Propodeum sparsely covered by long pubescence, conspicuously carinate; two lateral teeth present on either side, one rather blunt, upturned, located at each posterolateral angle, others on either side of insertion of petiole, spiracular openings nearly vertical; petiole glabrous, slightly less than three times as long as wide at widest point, several long setae present on each lateral margin near base, lateral carinae lacking, basal lamina broad on ventral side, indistinct or wanting on dorsal side; gaster shorter than metafemur; abdominal tergites 3 to 7 with sparse lateral setae; eighth tergite very faintly reticulated, sparsely covered by short setae; spiracular openings with anterior margins straight; cerci oval, located near anterior margin of epipygium; apices of ovipositor sheaths provided with long setae on ventral side.

Male: 4.5–5 mm. Antennal scape (fig. 8, *j*) slightly broader at apex than base; combined widths of compound eyes one-third greater than interocular space at level of antennal bases; inner tooth of metafemur wanting; petiole three times as long as wide.

Type locality.—Texas.

Types.—Holotype, female, 1791, Academy of Natural Sciences of Philadelphia. Synonym: *missouriensis* Howard, U.S.N.M. No. 2622.

The type of *S. missouriensis* Howard differs from the type of *S. dorsata* (Cresson) only in being red instead of yellow.

Host.—Unknown.

Distribution.—Florida, Illinois, Kansas, Missouri, North Carolina, Texas.

SPILOCHALCIS TRANSITIVA (Walker)

FIGURES 8, *k*; 12, *d*

Smiera transitiva WALKER, Trans. Ent. Soc. London, vol. 20, pp. 345, 371, 1862.

Smicra transitiva (Walker) WALKER, Notes on Chalcidiae, p. 51, 1871.—CRESSON, Trans. Amer. Ent. Soc., vol. 4, p. 57, 1872.—KIRBY, Journ. Linn. Soc. London, Zool., vol. 17, p. 66, 1883.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 36, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 234, 1887.

Spilochalcis transitiva (Walker) HOWARD, Journ. Linn. Soc. London, Zool., vol. 26, p. 130, 1896.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 385, 1898.—ASHMEAD, Trans. Ent. Soc. London, vol. 48, p. 336, 1900.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 41, 1909.

Smiera pulchra CRESSON, Proc. Ent. Soc. Philadelphia, vol. 4, p. 94, 1865; The Cresson types of Hymenoptera, p. 76, 1916.

Smicra pulchra (Cresson) WALKER, Notes on Chalcidiae, p. 51, 1871.—CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 38, 50, 1872.—CAMERON, Biologia Centrali-Americana, Hymenoptera, vol. 1, p. 79, 1883.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 35, 1885.—ASHMEAD, Trans. Amer. Ent. Soc., vol. 13, p. 125, 1886.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 234, 1887.

This yellow, or red, and black species is very close to *S. dorsata* (Cresson) but differs most obviously in having the basal outer ventral tooth of the metafemur large rather than minute.

Description.—Yellow or red with black markings; scrobe cavity usually, occipital area of head, most of mesopraescutum, mesal angles of axillae, anterior margin of mesoscutellum, apices of metacoxae, three spots on outer surface of metafemora, entire propodeum, and sometimes part of gaster, black; darkened area of mesopraescutum usually interrupted so as to produce two anterior squares and a posterior rectangular yellow area.

Female: 5–6.5 mm. Antennal scape short and stout, apex not quite reaching level of ventral margin of anterior ocellus, pedicel one-half, and ring segment one-sixth length of segment 4, segment 5 slightly shorter than 4, segments 5 to 11 equal, 12 and 13 narrower and shorter; scrobe cavity deep, marginal carina vague ventrad; interantennal projection provided with a conspicuous anterior lamina; lateral carinae of frons extending from near frontogenal suture to level of anterior ocellus; frons scatteringly punctured except on mesal area ventrad of antennal bases; frontal tentorial pits located near anterior margins of compound eyes and slightly ventrad of level of antennal bases; malar space one-fourth height of compound eye; frontogenal suture slightly curved, extending transversely from compound eye to dorsal articulation of mandible; combined widths of compound eyes slightly greater than width of interocular space at level of antennal bases; diameter of posterior ocellus slightly less than one-half width of interocellar space.

Dorsum of thorax coarsely punctured; anterolateral angles of pronotum strongly carinate, carina of anterior dorsal margin interrupted on meson; parapsidal furrows partly obliterated; prepectus entirely concealed by a hooklike projection of anterolateral angle of the mesoscutum; mesoscutellum bidentate, these projections blunt, slightly converging, and upturned; metepisternum conspicuously punctured, densely setose; metacoxae entirely glabrous, covered by long, fine setae except on outer dorsal side; metafemora (fig. 12, *d*) glabrous, basal outer ventral tooth nearly as long as following teeth, second and third tooth long, narrow, acute, apical tooth blunt; inner tooth wanting; metatibia with apex long, lanceolate, slightly curved.

Propodeum sparsely setose, conspicuously carinate, two prominent lateral projections present on each side, one, long and slender and directed slightly dorsally, located at each posterolateral angle of propodeum, the other smaller, located near point of insertion of petiole, spiracular openings nearly vertical; petiole glabrous, slender, nearly three times as long as wide at widest point, basal lamina wide on ventral side, lacking on dorsal side, a few long, scattered setae present on each lateral margin; gaster usually seven-eighths length of metafemur; abdominal tergites 3 to 7 with long, sparse lateral setae; eighth tergite but sparsely covered with long setae, spiracular openings with anterior margin straight; cerci oval, located near anterior margin of epipygium; apices of ovipositor sheaths provided with long setae.

Male: 4–6.5 mm. Antennal scape broader at apex than base (fig. 8, *k*); malar space one-fourth height of compound eye; combined widths of compound eyes one-fifth greater than interocular space at level of antennal bases; metafemur without an inner tooth; petiole three times as long as wide.

Type locality.—Florida.

Types.—Holotype, female, British Museum. The male was described as *Smicra pulchra* Cresson, from Cuba; types, 1815.1–1815.4, Academy of Natural Sciences of Philadelphia.

Kirby [11] synonymized *Smicra pulchra* (Cresson) with *S. transitiva* (Walker), and notes and sketches from Walker's type, kindly furnished by Dr. Ch. Ferrière, leave no doubt that the synonymy is correct.

Host.—Catopsilia eubule (Linnaeus) (Lepidoptera, Pieridae).

Distribution.—Florida: Belleair, Mrs. A. T. Slosson, 1 female; Dade City, November 21, 1907, Russell, 1 male; De Funiak Springs, October 17, 1914, 1 male; Gainesville, September 26, 1914, 1 male, 1 female; December 10, 1917, H. L. Dozier, 1 female; Jacksonville, Ashmead, 4 females. Georgia: 1 female.

[11] Journ. Linn. Soc. London, Zool., vol. 17, p. 66, 1883.

CUBA: 2 males, 2 females (types of *pulchra* Cresson), ex *Catopsilia eubule;* north of Vinales, September 16, 1913, 1 female.

SPILOCHALCIS PHOENICA, new species

FIGURES 8, *l, m;* 12, *e*

This species is intermediate in some respects between *S. exornata* (Cresson) and *S. nigricornis* (Fabricius) but differs from the former in having more than four teeth on the outer ventral margin of the metafemur and from the latter in having two long, slender teeth on the metafemur (fig. 12, *e*) while *S. nigricornis* has all the teeth blunt (fig. 12, *f*). The male of this species differs from all other species in the genus occurring in this area in that the mesal flange of the antennal scape is produced ventrad of the antennal base (fig. 8, *m*) and the frons is excavated to receive this projection.

Description.—Red or yellow with black markings; mesopraescutum with narrow T-shaped mark, mesal margins of lobes of mesoscutum, mesal angles of axillae, mesoscutellum with narrow, longitudinal mark, apices of metacoxae, variable markings at outer ventral margins of metafemora, and apices of ovipositor sheaths, black.

Female: 6.5–7 mm. Apex of antennal scape not quite reaching level of ventral margin of anterior ocellus; pedicel slightly less than one-half length of segment 4; ring segment one-half length of pedicel, flagellum slightly tapering, segments 4 to 10 equal in length, 11 to 13 slightly shorter, sutures rather indistinct; scrobe cavity moderately deep, marginal carina vague except ventrad; interantennal projection provided with a wide, thin apical lamina; lateral carinae almost completely encircling compound eyes, somewhat indistinct on ventral half; frons scatteringly punctured on area surrounding scrobe cavity, lightly shagreened ventrad of level of antennal bases; frontal tentorial pits at anterior margins of compound eyes and slightly ventrad of level of antennal bases; width of malar space one-quarter height of compound eye; frontogenal suture extending transversely from compound eye to dorsal articulation of mandible; combined widths of compound eyes slightly greater than width of frons at level of antennal bases; diameter of posterior ocellus slightly greater than one-half interocellar space.

Dorsum of thorax densely and deeply pitted, areas between pits minutely reticulated; anterolateral angles of pronotum strongly carinate, anterior dorsal carina interrupted on mesal one-fifth; parapsidal sutures partly obscured; prepectus usually entirely concealed by an anterolateral angle of mesoscutum, occasionally partly exposed, never reaching tegula; mesopleuron with two strongly punctured areas, one dorsad of mesocoxa, other anterior and ventrad of base of posterior wing; apex of mesoscutellum bidentate, these

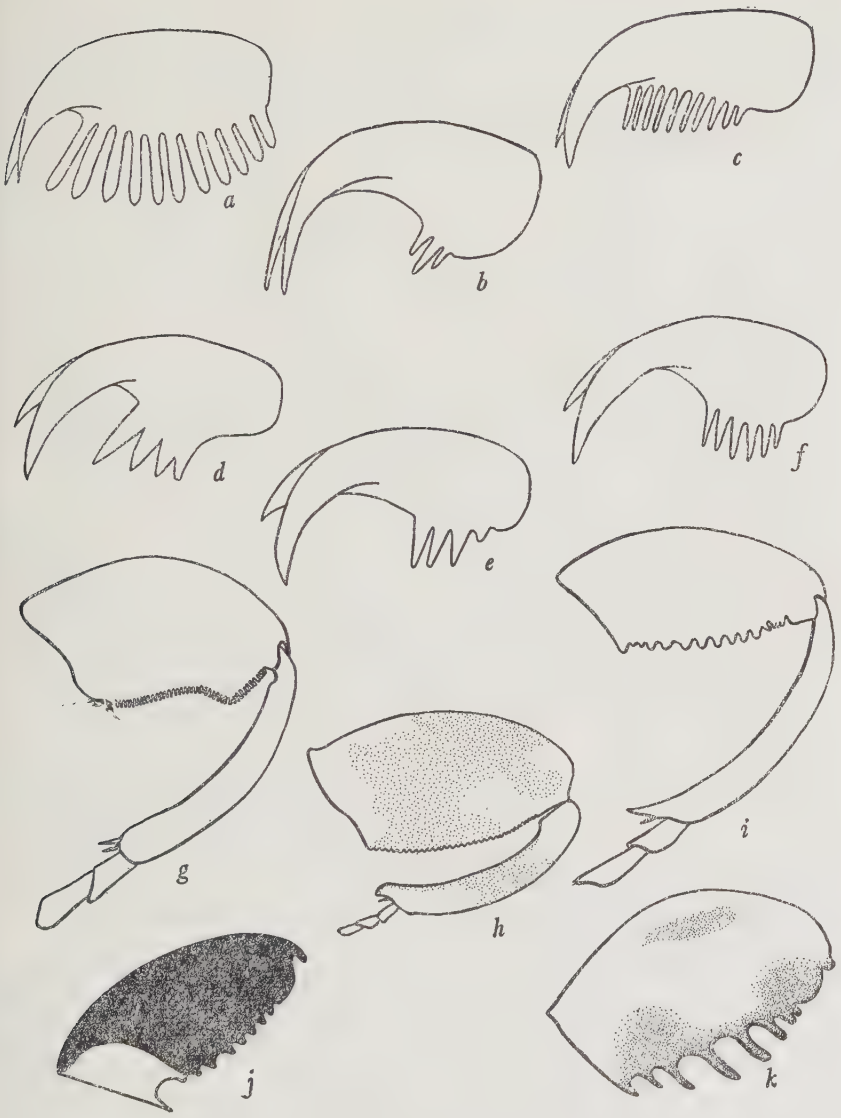

FIGURE 11.—Protarsal claws and metafemora, lateral aspect, of Chalcidini

a, *Chalcis lasia*, new species: Protarsal claw.
b, *Chalcis neptis*, new species: Protarsal claw.
c, *Chalcis flebilis* (Cresson): Protarsal claw.
d, *Chalcis barbara* (Cresson): Protarsal claw.
e, *Chalcis canadensis* (Cresson): Protarsal claw.
f, *i*, *Chalcis microgaster* Say: *f*, Protarsal claw; *i*, metafemur and tibia.
g, *Haltichella* sp.: Metafemur and tibia.
h, *Spilochalcis xanthostigma* (Dalman): Metafemur and tibia.
j, *Chalcis megalomis*, new species: Metafemur.
k, *Metadontia amoena* (Say): Metafemur.

projections slightly upturned and transparent, a small carina usually present on dorsal side of each; metepisternum coarsely reticulated, provided with a few very long setae on ventral half; metacoxae semiglobose, glabrous, provided with scattered long setae except on outer dorsal side; metafemora (fig. 12, *e*) glabrous, sparsely covered by short pubescence, outer basal ventral tooth small, second tooth smaller than basal one, two following teeth long, narrow, acute, apical tooth subdivided to form two or three small indistinct ones; inner tooth wanting; dorsal margin of metatibia sinuate where it closes against two long femoral teeth; apex of metatibia long, sharp, slightly curved dorsad.

Propodeum with numerous distinct carinae, those near base and on disk arranged so as to form a double row of rectangles across disk, a pair of conspicuous lateral projections present at posterolateral angles of propodeum, spiracular openings almost vertical; petiole short, glabrous, basal lamina wide on ventral side, slightly narrower on dorsal side, lateral carinae lacking; a few long lateral setae present near apex of petiole; gaster slightly longer than metafemur; lateral setae present on abdominal tergites 3 to 7; eighth tergite glabrous, sparsely provided with short black or yellow setae, spiracular openings round; cercus small, round, located slightly nearer anterior than posterior margin of epipygium, a small tuft of long setae ventrad of each cercus; apex of ovipositor sheaths with long ventral and lateral setae.

Male: 5–5.5 mm. Antennal scape with mesal lamina produced ventrad of antennal base (fig. 8, *l*, *m*); width of malar space slightly less than one-third height of compound eye; combined widths of compound eyes greater by one-third than width of interocular space at level of antennal bases; metafemur without an inner tooth.

Type locality.—Texas.

Types.—Holotype, female, Victoria, Tex., July 15, 1918, ex *Chlosyne lacinia crocale*, J. D. Mitchell; allotype, male, Devils River, Tex., May 2, 1907, F. C. Pratt; paratypes, E. H. Gibson, 1 female, Port Lavaca, Tex., July 15, 1925, 1 female, Brownsville, Tex., Esprza Ranch, August 18, 2 males. Holotype, allotype, and one female and two male paratypes deposited in the U. S. National Museum; one female paratype in Kansas Agricultural College, Manhattan, Kans.

Host.—*Chlosyne lacinia crocale* Edwards (Lepidoptera, Nymphalidae).

The nigricornis Group

The *nigricornis* group is clearly related to the *transitiva* group through the species *S. nigricornis* (see fig. 12, *f*, for the metafemur of this species). This predominantly tropical group is related to the *femorata* group through the species *S. coxalis* (Cresson). The pos-

session of numerous small metafemoral teeth, the long antennal scape, and the wide and deep scrobe cavity in *S. coxalis* suggest a close relationship with such species as *S. femorata* (Fabricius) and *S. mariae* (Riley). The members of the *nigricornis* group also show some slight relationship with the species of *Chalcis*. The somewhat transverse head of the species of this group and the rather slender metacoxae suggest an affinity with species such as *Chalcis barbara* (Cresson) or *C. microgaster* Say.

The species of the *nigricornis* group are invariably large, deeply and coarsely punctured, and covered with conspicuous long hair over most of the body. The lateral carinae of the frons are lacking; the scrobe cavity is only moderately deep, and the lateral margins are only partly carinate; the abdomen is strongly compressed laterally. The species of this group are all rare, and those that have been reared have come from the pupae of moths of the family Limacodidae.

KEY TO SPECIES OF THE NIGRICORNIS GROUP

1. Hindwings with five or six hamuli (fig. 10, *i*); inner tooth of metafemur present 2
   Hindwings with three hamuli (fig. 10, *j*); inner tooth of metafemur lacking 3
2. Anterior tentorial pits not connected on meson by a groove; metafemur yellow with black markings (fig. 12, *f*) ..... nigricornis (p. 279)
   Anterior tentorial pits connected on meson by a deep groove; metafemur entirely black ..... lanieri (p. 283)
3. Left mandible with three teeth; outer surface of metafemur with an oblique basal stripe ..... coxalis (p. 284)
   Left mandible with two teeth; outer surface of metafemur not with an oblique basal stripe 4
4. Outer basal tooth of metafemur long, slender, acute, much longer than any following teeth (as in fig. 12, *i*), metafemur yellow at base ..... flammeola (p. 286)
   Outer basal tooth of metafemur no larger than following teeth, metafemur black at base ..... nortoni (p. 287)

SPILOCHALCIS NIGRICORNIS (Fabricius)

FIGURES 8, *n*; 10, *i*; 12, *f*; 13, *a*

Chalcis nigricornis FABRICIUS, Entomologiae systematicae, suppl., p. 243, 1798; Systema piezatorum, p. 163, 1804.—JURINE, Nouvelle méthode de classer les hyménoptères et les diptères, p. 316, 1807.—CRESSON, Proc. Ent. Soc. Philadelphia, vol. 1, p. 228, 1862.

Smicra nigricornis (Fabricius) WALKER, Notes on Chalcidiae, p. 51, 1871.—CRESSON, Trans. Amer. Ent. Soc., vol. 4, p. 57, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 35, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 234, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 380, 1898.

Spilochalcis nigricornis (Fabricius) ASHMEAD, Mem. Carnegie Mus., vol. 1, p. 419, 1904.

Metadontia nigricornis (Fabricius) ASHMEAD, *ibid.* p. 453.

Chalcis bracata SANBORN, Rept. Secy. Massachusetts Board Agr. for 1862, p. 172, 1863.—PACKARD, Guide to the study of insects . . . , p. 203, 1889.

Smicra bracata (Sanborn) CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 37, 46, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 33, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—SMITH, Geol. Surv. New Jersey, Catalogue of insects, p. 37, 1890.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 374, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 34, 1909.

Spilochalcis bracata (Sanborn) VIERECK, Connecticut Geol. and Nat. Hist. Surv. Bull. 22, p. 527, 1916.

Spilochalcis braccata SMITH, Ann. Rept. New Jersey State Board Agr., vol. 27, suppl., p. 553, 1900; Ann. Rept. New Jersey State Mus. for 1909, p. 649, 1910.

Smicra bracata coaequalis CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 37, 46, 1872; Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 374, 1898.—CRESSON, The Cresson types of Hymenoptera, p. 74, 1916.

Smicra carolina ASHMEAD, Trans. Amer. Ent. Soc., vol. 14, p. 183, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 374, 1898.

Diplodontia carolina (Ashmead) ASHMEAD, Mem. Carnegie Mus., vol. 1, p. 252, 1904.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 46, 1909.—GAHAN and FAGAN, U. S. Nat. Mus. Bull. 124, p. 47, 1923.

Diplodontia secunda GIRAULT, Descriptiones hymenopterorum chalcidoidicarum variorum cum observationibus, No. 5, p. 10, 1917.—LEONARD, Cornell Univ. Agr. Exp. Stat. Mem. 101, p. 976, 1928.

Smicra maculata WALKER (not Fabricius), Entomologist, vol. 1, p. 217, 1841.

Chalcis maculata (Walker) CRESSON, Proc. Ent. Soc. Philadelphia, vol. 1, p. 228, 1862.

Smicra maculata (Walker) WALKER, Notes on Chalcidiae, p. 51, 1871.—CRESSON, Trans. Amer. Ent. Soc., vol. 4, p. 57, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 35, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 223, 1887.—SMITH, Geol. Surv. New Jersey, Catalogue of insects, p. 38, 1890.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 378, 1898.—SMITH, Ann. Rept. New Jersey State Board Agr., vol. 27, suppl., p. 554, 1900; Ann. Rept. New Jersey State Mus. for 1909, p. 649, 1910.

This large yellow and black species is most easily recognized by its densely pubescent propodeum with a pair of conspicuous lateral projections, the acute anterodorsal angles of the pronotum, and the metafemur having a few blunt, widely spaced teeth.

Description.—Yellow with black marks; vertex, all of mesoprascutum except lateral margins, mesal half or two-thirds of lobes of mesoscutum, mesal angles of axillae, mesal longitudinal mark on mesoscutellum, usually ventral half of metepisternum, all but outer basal part of metacoxae, central and ventral spots on metafemur, most or all of propodeum, petiole usually, and most of abdomen, black.

Female: 6–9 mm. Antennal scape stout, curved mesad near base, slightly constricted near apex, apex reaching to level of dorsal margin

of anterior ocellus, pedicel one-half and ring segment one-sixth length of segment 4, segments 4 to 8 equal in length, 9 and 10 slightly shorter, 11, 12, and 13 much shorter than 8; scrobe cavity deep, inner surface minutely shagreened, margins acarinate laterad; interantennal projection with small apical lamina; frons densely punctured on area laterad of scrobe cavity, scatteringly punctured and with short transverse carinae ventrad of antennal bases; frontal tentorial pits not visible; frons without lateral carinae; width of malar space slightly more than one-third height of compound eye; frontogenal suture extending in a low arc from compound eye to mandible, a secondary carina often present dorsad of suture near mandible; combined widths of compound eyes one-tenth less than interocular width at level of antennal bases; left mandible with two indistinct teeth, rarely with three, the ventral one slightly smaller and more acute, right mandible usually with three teeth, occasionally with only two; diameter of posterior ocellus slightly more than one-half interocellar width.

Dorsum of thorax covered by large deep punctures, spaces between pits minutely reticulated, pubescence fine and long; anterior margins of pronotum strongly carinate laterad, anterolateral angles produced, toothlike, mesal one-third of anterior dorsal margin without a carina; mesoscutum slightly produced laterad over tegulae; prepectus visible as a narrow tonguelike projection, not quite reaching tegula; mesoscutellum with a slight mesal depression near base and with a narrow, indistinct, apical lamina; metanotum with an irregular row of long, slender setae; dorsal and anterior areas of metepisternum deeply pitted, areas between pits and unpunctured areas glabrous; metacoxa glabrous, setose except on outer dorsal side; metafemur (fig. 12, *f*) glabrous, densely covered with short setae on outer surface, outer basal tooth small, followed by one, two, or three smaller teeth, then two or three large blunt teeth, apical tooth slightly smaller and more blunt, indistinctly subdivided to form three or four teeth; sharp inner tooth present; dorsal margin of metatibia sinuate where it fits against larger teeth.

Propodeum completely covered by long setae, one large lateral tooth present on each side (fig. 13, *a*), carinae of propodeum strong, irregular, spiracular openings vertical or slanting slightly laterad; petiole short, stout, less than twice as long as wide, surface glabrous, basal lamina wide on ventral side, narrow on dorsum, interrupted at laterodorsal angles, indistinct lateral carinae usually present near base; gaster slightly shorter than metafemur, strongly flattened, abdominal segments 3 to 7 with a few dorsal and lateral setae, eighth tergite glabrous or minutely pitted, sparsely setose, spiracular openings with anterior margins straight; cerci round or nearly so, located

slightly nearer anterior than posterior margin of epipygium, placed in an indistinct setose area, which is bounded mesad and cephalad by a vague carina; apex of ovipositor sheath provided with moderately long ventral setae.

Male: 5.5–8.5 mm. Antennal scape (fig. 8, *n*) expanded near base; combined widths of compound eyes equal to interocular width at level of antennal bases; metafemur with a blunt inner tooth; petiole twice as long as wide.

Type locality.—"North America."

Type.—Chalcis No. 13, Fabricius collection, University of Kiel, Kiel, Germany. Type much broken, moldy; sex not discernible. Specimens compared with this type by Dr. Olaw Schroeder. Synonyms: *bracata* Sanborn, Boston Society of Natural History (comparisons made by Dr. Richard Dow); *bracata coaequalis* Cresson, 1788, Academy of Natural Sciences of Philadelphia; *carolina* Ashmead, 41181, U. S. National Museum; *secunda* Girault, 20750, U. S. National Museum.

This large, conspicuous species is so variable that it is not surprising that it has been described several times. The type of *S. carolina* Ashmead is somewhat broken but shows no differences in either color or structure from specimens compared with the type of *C. nigricornis*. Dr. Richard Dow, of the Boston Society of Natural History, informs me that the type of *C. bracata* Sanborn lacks the abdomen but is identical with the specimens of *nigricornis* sent. The type of *D. secunda* Girault is considerably broken, but the remains show no valid departure from the typical *nigricornis*. All the references to *maculata* enumerated above were derived from Walker's record of what he supposed to be *maculata* Fabricius from New York. Dr. Ch. Ferrière, of the British Museum, has kindly located Walker's specimen for me, and he states that this specimen, although somewhat broken, can be identified as *nigricornis*. *Chalcis maculata* Fabricius was described from South America, and Ashmead [12] placed it in his genus *Tetrasmicra;* it is possible that he had seen the type.

Hosts.—Parasa indetermina Boisduval, *Adoneta spinuloides* Herrich-Schaeffer, *Limacodes* sp. (Lepidoptera, Limacodidae).

Distribution.—Connecticut, Illinois, Indiana, Louisiana, Maryland, Massachusetts, Nebraska, New Hampshire, New Jersey, New York, North Dakota, North Carolina, South Carolina, South Dakota, Texas, Virginia.

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[12] Mem. Carnegie Mus., vol. 1, p. 456, 1904.

SPILOCHALCIS LANIERI (Guérin)

FIGURE 12, *g*

Chalcis lasnierii GUÉRIN, Iconographie du Règne animal de G. Cuvier . . ., vol. 1, p. 412, 1845.—CRESSON, Proc. Ent. Soc. Philadelphia, vol. 1, p. 228, 1862.

Chalcis lanieri GUÉRIN, *in* de la Sagra's Historia fisica, politica y natural de la isla de Cuba, vol. 7, p. 735, 1857.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 36, 1885.

Smicra lanieri (Guérin) CRESSON, Proc. Ent. Soc. Philadelphia, vol. 4, p. 91, 1865.—WALKER, Notes on Chalcidiae, p. 51, 1871.—CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 37, 48, 1878.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 378, 1898.—ASHMEAD, Trans. Ent. Soc. London, vol. 48, p. 337, 1900.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 35, 1909.

Spilochalcis lanieri (Guérin) GAHAN, Mem. Soc. Poey, Univ. Habana, vol. 8, p. 131, 1934.

This species may be recognized at once by its dark brown wings, which retain a quite complete representation of the venation, and the entirely black metafemora. Structurally this species is almost indentical with *Spilochalcis nigricornis* (Fabricius).

Description.—Black, with bright scarlet markings; forelegs and mesolegs, mandibles, narrow stripe surrounding compound eyes, mesodorsal area and anterolateral margins of pronotum, lateral margins of mesopraescutum, entire mesoscutellum, metatibia, and basal segments of gaster, scarlet.

Female: 8 mm. Apex of antennal scape not quite reaching level of dorsal margin of anterior ocellus, pedicel one-fourth and ring segment one-sixth length of segment 4, segments 4 to 8 equal in length, 9 to 10 slightly shorter, last three combined slightly longer than segment 4; width of malar space one-third height of compound eye; frontogenal suture slightly curved; left mandible with two teeth, right with three; combined widths of compound eyes slightly less than width of interocular space at level of antennal bases; diameter of posterior ocellus five-ninths interocellar space; a carina extending completely around posterior margin of head.

Dorsum of thorax deeply punctured, narrow area at anterior margin of metepisternum not punctured, but minutely reticulated; setae long, coarse; anterolateral angles of pronotum acutely produced, toothlike, carina of anterior dorsal margin interrupted on mesal one-half; prepectus not quite reaching tegula; hind wings with five hamuli; mesoscutellum with a slight longitudinal mesal depression near base, apex with a minute lamina; metepisternum not punctured at posterior margin, ventral margin provided with a row of large, contiguous punctures, rest of area covered with smaller punctures, spaces between them glabrous; metacoxae glabrous; metafemora glabrous, outer surface sparsely covered by long setae, teeth of ventral margin quite variable: one to four minute basal teeth, followed by

three larger ones (fig. 12, *g*), apical one vaguely divided; inner tooth large, acute.

Propodeum with a pair of large lateral teeth (as in fig. 13, *a*), spiracular openings vertical; petiole glabrous, two and one-quarter times as long as wide, lateral carinae wanting; gaster strongly flattened, all segments of gaster with sparse lateral setae; spiracular opening of eighth tergite rounded, but anterior margin straight; cerci oval, located near anterior margin of epipygium; ovipositor sheaths densely covered with short, stiff setae.

Male.—Unknown.

Type locality.—Cuba.

Type.—I have not located the type of this species, and it may be lost. As this type may, however, yet be found, it seems best not to designate a neotype. I have followed Cresson's determination [13] for the species.

Host.—Unknown.

Distribution.—Florida: Palm Beach, C. F. Baker, 1 female.

Cuba: 2 females.

SPILOCHALCIS COXALIS (Cresson)

Smicra coxalis Cresson, Trans. Amer. Ent. Soc., vol. 4, pp. 36, 45, 1872.—Howard, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 34, 1885.—Cresson, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—Dalla Torre, Catalogus hymenopterorum, vol. 5, p. 375, 1898.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 34, 1909.—Cresson, The Cresson types of Hymenoptera, p. 74, 1916.

Spilochalcis virens Howard, U. S. Dept. Agr. Bur. Ent. Bull. 5, pp. 6, 36, 1885.—Dalla Torre, Catalogus hymenopterorum, vol. 5, p. 385, 1898.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 41, 1909.

Smicra virens (Howard) Cresson, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 234, 1887.

This large, compact species is most easily recognized by the densely pubescent propodeum without lateral teeth, the compressed abdomen, and the metafemora with the ventral margin provided with several minute, widely spaced teeth; both mandibles have three teeth.

Description.—Yellow or red with black markings; vertex, all but lateral margins of mesopraescutum, all but lateral margins of lobes of mesoscutum, mesal two-thirds of axillae, broad longitudinal mark on mesoscutellum, usually wide inner and outer stripes on metacoxae, oblique stripe on outer surface of metafemur near base, transverse band at base of propodeum, most of petiole, and transverse dorsal marks on gaster, black.

Female: 7.5–9 mm. Apex of antennal scape exceeding level of posterior ocelli, pedicel two-fifths and ring segment one-eighth length of segment 4, segments 4 and 5 almost equal, 6 to 10 progressively

[13] Proc. Ent. Soc. Philadelphia, vol. 1, p. 228, 1862.

shorter, 11 three-quarters length of 10, 12 and 13 considerably shorter than 11 but quite variable in exact size; scrobe cavity rather shallow, edge carinate on ventral margin and ventral one-third of lateral margins; interantennal projection with a narrow, apical lamina; lateral carinae of frons wanting; entire frons deeply and densely punctured, and provided with long setae; frontal tentorial pits located near antennal bases, slightly dorsad of antennal bases; width of malar space slightly more than one-third height of compound eye; frontogenal suture extending in a low arc from compound eye to dorsal articulation of mandible; combined widths of compound eyes two-thirds width of interocular space at level of antennal bases; both mandibles with three teeth; diameter of posterior ocellus slightly less than one-half width of interocellar space.

Dorsum of thorax densely punctured, lateral punctures slightly larger than mesal ones, areas between punctures varying from glabrous to lightly reticulated; pubescence dense, long, fine; anterolateral angles of pronotum only faintly carinate, anterior dorsal margin without a carina on mesal three-quarters, a rounded projection present near each posterior laterodorsal angle of pronotum; parapsidal sutures partly obscured by punctures; prepectus not visible; apex of mesoscutellum provided with a minute lamina; metepisternum broad, shallowly pitted, areas between pits glabrous, sparsely covered by long setae; metacoxae glabrous, very slender near apex, sparsely covered by long pubescence; metafemora glabrous, outer surface covered by short pubescence, ventral margin arcuate, with 12 to 16 minute, blunt, widely spaced teeth; inner tooth lacking; apex of metatibia acute, slightly curved dorsad.

Propodeum densely covered by long, slender setae, carinae strong, but irregular, enclosing nearly quadrangular areas, one very slight lateral tooth present on each side near point of insertion of petiole, spiracular openings large, extending obliquely laterad; petiole glabrous or showing very faint shagreening under a strong light, a prominent lateral furrow extending from base to apex on either side, basal lamina narrow, interrupted at dorsolateral angles; gaster strongly flattened, slightly larger than metafemur, prominent lateral rows of setae present on abdominal tergites 3 to 7; eighth tergite minutely pitted, covered with long, stout setae, spiracular openings round; cerci oval, located near anterior margin of epipygium and usually bearing three long setae; apices of ovipositor sheaths densely covered with long setae.

Male: Unknown.

Type locality.—Delaware.

Types.—Holotype, female, 1787, Academy of Natural Sciences of Philadelphia. Synonym, *virens* Howard, 2623, U. S. National Museum.

188858—40——4

The original description of *S. coxalis* Cresson erroneously states that the species is described from a male; the type is a female. The type of *S. virens* Howard differs neither in color nor in structure from the type of *S. coxalis* Cresson.

This species may prove to be a synonym of *Spilochalcis conjungens* (Walker). *Smicra conjungens* was described from a single female specimen from Mexico one year previous to the publication of the description of *Smicra coxalis* Cresson. A specimen I had compared with the type of the latter species was sent to the Muséum National d'Histoire Naturelle in Paris for comparison with Walker's type. Dr. Lucien Berland kindly made a detailed study of the specimens and informed me that they differed slightly in the sculpturing of the propodeum and the shape of the metafemoral teeth. Neither of these characters is, in itself, sufficient for specific distinction in this group. I have, however, decided to use, for the present, the name concerning the correctness of which I have no doubt, rather than employ one that is somewhat questionable.

Host.—Unknown.

Distribution.—Delaware, Georgia, Iowa, Maryland, Missouri, New Jersey, New York, North Carolina, Virginia.

SPILOCHALCIS FLAMMEOLA (Cresson)

Smicra flammeola CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 37, 48, 1872.—CAMERON, Biologia Centrali-Americana, Hymenoptera, vol. 1, p. 84, 1884.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 34, 1885.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 377, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 34, 1909.—CRESSON, The Cresson types of Hymenoptera, p. 75, 1916.

Smicra flammula KIRBY, Journ. Linn. Soc. London, Zool., vol. 17, p. 66, 1883.

This species is most easily recognized by its very coarsely pitted thorax, the toothlike anterolateral angles of the pronotum, and the metafemur with a long, acute, outer basal tooth and no inner tooth.

Description.—Bright red, with frons, anterior and mesolegs, dorsal spot at base of outer surface of metafemur, and usually petiole, yellow; venter of thorax black.

Female: 7 mm. Antennal flagellum slender; scrobe cavity shallow, carinate at ventral margin; interantennal projection with a small anterior carina, this carina extending up into scrobe cavity almost to anterior ocellus; frons deeply punctured just ventrad and laterad of ocelli, a few vague carinae extending ventrolaterad from margins of scrobe cavity; frons slightly produced ventrad of antennal bases; frontal tentorial pits located just laterad of and slightly ventrad of antennal bases; width of malar space slightly more than one-third height of compound eye; frontogenal suture straight; widths of compound eyes slightly less than width of interocular space at level of

antennal bases; left mandible with two teeth, ventral one larger, right mandible with three teeth, two dorsal ones blunt, ventral one larger and more acute; diameter of posterior ocellus slightly less than one-half width of interocellar space.

Dorsum of thorax irregularly covered by large, deep punctures, areas between punctures minutely reticulated, pubescence long, fine; anterolateral angles of pronotum acutely projecting, toothlike, anterior dorsal carina interrupted on mesal one-third; parapsidal furrows partly obliterated; prepectus entirely concealed by projecting lateral margin of mesoscutum; apex of mesoscutellum with a rather wide lamina; metepisternum strongly and densely punctured except at posteroventral angle, pubescence sparse and fine; metacoxae glabrous, provided, except on outer dorsal surface, with long setae; outer surface of metafemora glabrous, sparsely covered by long, black setae, basal tooth large, acute, followed by 13 or 14 small acute teeth; inner tooth wanting; apex of metatibia long, slender, acute.

Propodeum provided with long setae at posterolateral angles, surface provided with large, strong carinae, areas between carinae almost glabrous, spiracular openings small, vertical, no lateral projections present on propodeum; petiole glabrous, provided with several long, lateral setae, basal lamina narrow, interrupted at dorsolateral angles; gaster compressed, usually slightly longer than metafemur, abdominal tergites 3 to 7 each with long lateral setae; eighth tergite densely covered by minute pits, setae long, sparse, spiracular openings oval; cerci oval, located midway between anterior and posterior margins of epipygium; apex of ovipositor sheaths provided with dense, short ventral setae.

Male: Unknown.

Type locality.—Mexico.

Types.—Holotype, female, 1811.1; paratypes, 1811.2, 1811.5, 2 females: Academy of Natural Sciences of Philadelphia. The two supposed paratypes of this species labeled 1811.3 and 1811.4, in the collection of the Academy of Natural Sciences of Philadelphia, unquestionably represent another species. The original description of this species states that it was described from both males and females, but all the type specimens are females.

Host.—Unknown.

Distribution.—Texas: Brownsville, November 25, 1910, 1 female. Mexico: 3 females (holotype and paratypes).

SPILOCHALCIS NORTONI (Cresson)

Figures 8, *o;* 10, *j;* 13, *c*

Smicra nortoni Cresson, Trans. Amer. Ent. Soc., vol. 4, pp. 36, 45, 1872.—Howard, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 35, 1885.—Cresson, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 234,

1887.—Dalla Torre, Catalogus hymenopterorum, vol. 5, p. 380, 1898.—Smith, Ann. Rept. New Jersey State Board Agr., vol. 27, suppl., p. 554, 1900.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 36, 1909.—Cresson, The Cresson types of Hymenoptera, p. 76, 1916.

Spilochalcis nortoni (Cresson) Smith, Ann. Rept. New Jersey State Mus. for 1909, p. 649, 1910.—Viereck, Connecticut Geol. and Nat. Hist. Surv. Bull. 22, p. 527, 1916.

This large yellow and black species is most easily recognized by its densely pubescent metanotum and propodeum, the latter without lateral teeth; the left mandible has two teeth and the right three indistinct ones.

Description.—Yellow with black markings; vertex, all but lateral margins of mesopraescutum and mesoscutum, mesal two-thirds of axillae, mesal longitudinal mark on mesoscutellum, broad outer and inner basal stripes of metacoxae, irregular area at base of metafemora, transverse basal stripe on propodeum, and transverse dorsal bands on gaster, black.

Female: 9–11 mm. Antennal scape constricted just ventrad of apex, reaching level of posterior ocelli, pedicel slightly less than one-half and ring segment one-sixth length of segment 4, segments 4 to 9 equal in length, 10 slightly shorter, 11 two-thirds length of 10, 12 and 13 together slightly longer than 11; scrobe cavity deep, edge carinate only at ventral margin and ventral one-fourth of lateral margins, interantennal projection wide, without an apical lamina; frons without lateral carinae; frons deeply and densely punctured except on small patch just dorsal to clypeus; frontal tentorial pits not visible; width of malar space slightly less than one-third height of compound eye; frontogenal suture extending in a low arc from compound eye to dorsal articulation of mandible; width of interocular space at level of antennal bases greater by one-fifth than combined widths of com-

Figure 12.—Metafemora, lateral aspect, of Chalcidini

a, *Spilochalcis exornata* (Cresson).
b, *Spilochalcis eubule* (Cresson).
c, *Spilochalcis dorsata* (Cresson).
d, *Spilochalcis transitiva* (Walker).
e, *Spilochalcis phoenica*, new species.
f, *Spilochalcis nigricornis* (Fabricius).
g, *Spilochalcis lanieri* (Guérin).
h, *Spilochalcis delicata* (Cresson).
i, *Spilochalcis femorata* (Fabricius).
j, *Spilochalcis mariae* (Riley).
k, *Spilochalcis subobsoleta* (Cresson).
l, *Ceratosmicra paya*, new species.
m, *Ceratosmicra debilis* (Say).
n, *Ceratosmicra immaculata* (Cresson).
o, *Ceratosmicra meteori*, new name.

FIGURE 12.—See opposite page for explanation.

pound eyes; left mandible with two teeth, right with three, the two ventral ones indistinctly divided; diameter of posterior ocellus two-fifths width of interocellar space.

Dorsum of thorax covered with large punctures, spaces between punctures minutely reticulated; pubescence long, fine; anterolateral angles of pronotum carinate; anterior dorsal margin of pronotum acarinate on mesal one-quarter; parapsidal furrows distinct; the surface of mesopraescutum slightly higher than surface of mesoscutum; prepectus narrow, tonguelike, not quite reaching tegula; anterior margin of mesoscutellum with a minute mesal projection, apex with a minute lamina; metepisternum covered with deep, nearly contiguous pits; metacoxae relatively slender, surface almost glabrous, reticulations extremely faint; metafemora glabrous, outer surface densely covered by short pubescence, outer ventral margin with 11 to 18 small blunt teeth; inner tooth lacking; basal enlargement of posterior claw with several large teeth.

Propodeum densely covered by long setae; reticulations prominent, rather irregular, enclosing large, nearly rectangular areas near apex; strong lateral projections wanting (fig. 13, *c*), spiracular openings wide, almost vertical; petiole glabrous, short, less than twice as long as wide, basal lamina narrow on ventral side, slightly wider on dorsal side, interrupted at dorsolateral angles, faint longitudinal, lateral grooves present; gaster strongly compressed, slightly larger than metafemur; abdominal tergites 3 to 7 with rows of short lateral setae; eighth tergite minutely punctured, densely covered by long pubescence, spiracular openings with anterior margins straight; epipygium densely pubescent, cerci oval, located near anterior margin and provided with four or five long setae; apices of ovipositor sheaths with long, dense setae.

Male: 7.5 mm. Antennal scape (fig. 8, *o*) broad, slightly expanded at apex; width of malar space one-quarter height of compound eye; petiole twice as long as wide.

Type locality.—District of Columbia.

Type.—Neotype, male, Bolton, Conn., July 20, 1932, ex *Phobetron pithecium;* deposited in the U. S. National Museum. This species was originally described from a single male specimen collected by Edward Norton in Washington, D. C., and the type has subsequently been lost. A neotype is, therefore, designated.

Hosts.—Prolimacodes badia (Hübner), *Phobetron pithecium* Abbot and Smith (Lepidoptera, Limacodidae).

Distribution.—Connecticut, District of Columbia, Illinois, Massachusetts, New Jersey, New York, Texas, Virginia.

The femorata Group

The *femorata* group is predominantly tropical but includes one very common species in our region, *S. mariae* (Riley). In all species of this group the antennal scape is long, and the flagellum is usually slender. The scrobe cavity is either deep or shallow; the frons is always slightly produced anteriorly just ventrad of the antennal bases. All the species of this group have the metafemoral teeth minute and closely set, but the basal tooth is often considerably larger than the following ones; all species are yellow or red with relatively small darker markings.

KEY TO SPECIES OF THE FEMORATA GROUP

1. Female, ninth abdominal sternite concealed, antennal scape slender 2
   Male, ninth abdominal sternite exposed, antennal scape broad 8
2. Head, from dorsal aspect, one-half as long as wide, apex of antennal scape reaching only to level of posterior ocelli 3
   Head transverse, from dorsal aspect much less than one-half as long as wide; apex of antennal scape markedly exceeding level of posterior ocelli 5
3. Metepisternum entirely glabrous, stigmal vein of forewing rounded at apex (fig. 10, *h*) ..... **delicata** (p. 292)
   Metepisternum punctured, stigmal vein of forewing angled at apex (fig. 10, *k*) 4
4. Width of head much greater than maximum width of dorsum of thorax; spiracular openings on propodeum wider dorsad than ventrad ..... **elachis** (p. 294)
   Width of head equal to maximum width of dorsum of thorax; spiracular openings on propodeum equal in width dorsad and ventrad ..... **hirtifemora** (p. 295)
5. Surface of mesopraescutum and scutum provided only with punctures ..... **femorata** (p. 297)
   Surface of mesopraescutum and scutum provided both with punctures and carinae, the carinae on mesopraescutum transverse, those on lobes of mesoscutum directed obliquely cephalad from posteromesal angles 6
6. Metafemur with a small inner tooth; a brown spot surrounding stigmal vein; mesopraescutum always with a median black line, this line usually broader at anterior than at posterior margin; anterior lamina of pronotum slightly incised near dorsolateral angle ..... **igneoides** (p. 301)
   Not having that combination of characters 7
7. Strong lateral carinae present on petiole, and venter of petiole usually slightly rugose; metacoxae always with a black stripe on outer dorsal surface extending almost from base to apex. **mariae** (p. 303)
   Petiole either without lateral carinae or with faint ones near base, and venter of petiole smooth; metacoxae with a dark spot on outer dorsal surface, this spot not reaching apex of coxa ..... **phais** (p. 307)

8. Metepisternum entirely glabrous, stigmal vein of forewing rounded at apex (fig. 10, *h*) ..... delicata (p. 292)
Metepisternum punctured, stigmal vein of forewing angled at apex (fig. 10, *k*) 9
9. Apex of antennal scape reaching only to level of posterior ocelli; head, from dorsal aspect, one-half as long as wide ..... hirtifemora (p. 295)
Apex of antennal scape markedly exceeding level of posterior ocelli; head, from dorsal aspect, much less than one-half as long as wide 10
10. Surfaces of mesopraescutum and scutum provided only with punctures ..... femorata (p. 297)
Surfaces of mesopraescutum and scutum provided both with punctures and carinae, the carinae on mesopraescutum transverse, those on lobes of mesoscutum directed obliquely cephalad from posteromesal angles 11
11. Pedicel of antenna triangular (fig. 9, *u*) ..... mariae (p. 303)
Pedicel of antenna cylindrical (fig. 9, *t*) 12
12. Anterior mesal margin of antennal scape strongly incised (fig. 8, *s*) ..... igneoides (p. 301)
Anterior mesal margin of antennal scape not incised (fig. 9, *a*, *b*) 13
13. Antennal scape broadened only at apex, slightly excavated at apex (fig. 9, *a*) ..... clora (p. 306)
Antennal scape broad from near base to apex, deeply excavated at apex (fig. 9, *b*) ..... phais (p. 307)

SPILOCHALCIS DELICATA (Cresson)

FIGURES 8, *p*; 10, *h*; 12, *h*; 13, *b*

Smicra delicata CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 38, 54, 192, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 34, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 375, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 34, 1909.—CRESSON, The Cresson types of Hymenoptera, p. 74, 1916.

Smicra delicatula CAMERON, Biologia Centrali-Americana, Hymenoptera, vol. 1, p. 94, 1884.

This small yellow species is most easily recognized by its very wide interocular space, the shallow scrobe cavity, the broad, compact thorax with the dorsal surface nearly glabrous, the rather long, slender petiole, and slender metafemora with a large, acute inner tooth; the apex of the antennal scape of the male markedly exceeds the level of the posterior ocelli but only reaches this level in the female.

Description.—Yellow, with vague, variable orange or light-brown markings; occiput, broad mesal area of mesopraescutum, most of lobes of mesoscutum, mesal angles of axillae, apex of mesoscutellum, spot on mesopleuron, basal mark on outer dorsal surface of metacoxa, and apical segment of posterior tarsus, usually orange or light brown; metafemoral teeth and, in some specimens, basal segments of gaster, black.

Female: 3.5 mm. Apex of antennal scape reaching level of posterior ocelli, pedicel much narrower than flagellar segments, two-thirds length of segment 4, ring segment one-half length of pedicel, segment 5 slightly shorter than 4, segments 5 to 11 equal in length, 12 and 13 slightly shorter; scrobe cavity shallow, margin carinate only at ventrolateral angles; apical carina of interantennal projection extended dorsad one-half distance to anterior ocellus; frontal tentorial pits minute, located near margin of compound eye, and ventrad of antennal bases; frons almost glabrous, with minute slightly irregular carinae, these carinae transverse on area of frons ventrad of antennal bases, pubescence long, sparse; small mesal area located just dorsad of clypeus more closely reticulated than remainder of frons; width of malar space one-third height of compound eye; frontogenal suture almost straight, very slightly curved; a vague carina usually present on genal area parallel to posterior margin of compound eye; combined widths of compound eyes two-thirds width of interocular space at level of antennal bases; left mandible with two teeth, ventral one much longer than dorsal, right mandible with three teeth, middle one minute; diameter of posterior ocellus one-third interocellar space.

Dorsum of thorax minutely reticulated, almost glabrous, a few vague, shallow punctures present, pubescence long, sparse; anterolateral angles and anterior dorsal margin of pronotum acarinate, prepectus wider than in most species, just reaching anterior apex of tegula; stigmal knob of forewing large, rounded (fig. 10, *h*); apex of mesoscutellum with an extremely narrow lamina; metepisternum glabrous; metacoxae glabrous on outer dorsal surface, sparsely covered with short setae on ventral side; metafemora rather narrow (fig. 12, *h*), outer ventral margin provided with 14 to 20 small, acute teeth, these teeth often widely spaced; inner tooth large, acute.

Propodeum with a single mesal and lateral carina, basolateral areas minutely reticulated, almost smooth, spiracular openings slanting laterad (fig. 13, *b*), no lateral propodeal teeth present; petiole glabrous, twice as long as wide, basal lamina wide on ventral side, narrow on dorsal; gaster usually equal in length to metafemur, abdominal tergites 4 to 7 each with a single sparse lateral row of long setae; eighth tergite slightly shagreened, provided with a few slender, inconspicuous setae, spiracular openings round; cerci large, oval, located near posterior margin of epipygium; apex of ovipositor sheath with a few long ventral setae.

Male: 3.5–4 mm. This species exhibits greater antigeny than most other species of the genus. Antennal scape (fig. 8, *p*) with apex markedly exceeding level of posterior ocelli, antennal segments 5 to 10 usually equal, last three slightly shorter; width of malar space three-tenths height of compound eye; combined widths of compound

eyes four-fifths interocular space; diameter of posterior ocellus three-sevenths interocellar space; petiole three times as long as wide.

Type locality.—Texas.

Types.—Holotype, female, 1794, Academy of Natural Sciences of Philadelphia; allotype, male, 1654, U. S. National Museum.

Host.—Unknown.

Distribution.—FLORIDA: Jacksonville, 1 male. TEXAS: Belfrage, 49, 1 female, 1 male (holotype and allotype); Brownsville, November 23–December 1, 1910, 3 males; Cameron County, August 3, 1928, R. H. Beamer, 1 female; Corpus Christi, October 16, 1908, Mitchell and Bishopp, 1 male.

SPILOCHALCIS ELACHIS, new species

This species is closely related to *S. hirtifemora* (Ashmead) but differs in having the head wider in comparison to the thorax, the propodeum very weakly carinate, with the areas between carinae reticulated rather than glabrous; the spiracular slits of the propodeum are wider dorsad than ventrad, while these openings are uniform in width in *hirtifemora.*

Description.—Dull yellow or orange; venter of thorax, vague longitudinal stripe on mesopraescutum, and most of abdomen, light brown.

Female: 2–2.5 mm. Apex of antennal scape reaching level of dorsal margin of anterior ocellus, pedicel equal to and ring segment one-quarter length of segment 4, segment 5 slightly shorter than 4, 6 slightly longer than 5, 6 to 10 equal, 11 slightly shorter, 12 slightly longer than 10, 13 as long as 11; scrobe cavity shallow, only ventral margin carinate; interantennal projection with a minute anterior carina; frons minutely reticulated laterad of scrobe cavity, scatteringly punctured just anterior to posterior ocelli and ventrad of antennal bases; frontal tentorial pits not visible; width of malar space one-third height of compound eye; frontogenal suture slightly curved, almost straight; combined widths of compound eyes equal to interocular space at level of antennal bases; left mandible with two acute teeth, ventral one slightly larger; diameter of posterior ocellus slightly less than one-half interocellar space; width of head one-fourth greater than maximum dorsal width of thorax.

Dorsum of thorax densely covered by irregular, shallow punctures, pubescence short, sparse; anterolateral angles of pronotum obscurely carinate, anterior dorsal margin acarinate; parapsidal furrows distinct; prepectus not visible, completely hidden by anterolateral angles of mesoscutum; apex of mesoscutellum with a very narrow, mesally depressed lamina; metacoxae with a few large, indistinct ventral punctures, remainder of surface minutely shagreened; outer surface

of metafemora minutely shagreened, almost glabrous, ventral margin with 18 to 20 small closely set teeth, basal one slightly larger; inner tooth sharp.

Propodeum with a few long lateral setae, strong carinae present near apex and on meson, two minutely reticulated areas at base, spiracular slits almost vertical, wider dorsad than ventrad, propodeum without lateral projections; petiole three times as long as wide, surface minutely reticulated, basal lamina narrow, lateral carinae absent; gaster acuminate, slightly longer than metafemur, abdominal tergites 5 to 7 with sparse lateral setae; eighth tergite obscurely shagreened, almost glabrous, setae sparse, short, spiracular openings round, directed laterad; cerci obovate, located slightly nearer anterior than posterior margin of epipygium, the latter densely and minutely pitted and provided with long setae; apex of ovipositor sheath with a few short ventral setae.

Male.—Unknown.

Type locality.—Florida.

Types.—Holotype, female, Biscayne Bay, Fla.; paratype, Tallulah, La., 1194, 1 female. Types deposited in the U. S. National Museum.

Host.—Unknown; this species will probably prove to be a hyperparasite.

SPILOCHALCIS HIRTIFEMORA (Ashmead)

FIGURE 8, *q*

Smicra hirtifemora ASHMEAD, Trans. Amer. Ent. Soc., vol. 12, p. x, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 377, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 35, 1909.

Spilochalcis hirtifemora (Ashmead) WILSON, Florida Ent., vol. 16, p. 39, 1932; vol. 17, p. 3, 1933; Florida Agr. Exp. Stat. Techn. Bull. 271, p. 16, 1935.

Spilochalcis syrphidis WOLCOTT, Journ. Dept. Agr. Puerto Rico, vol. 7, p. 57, 1923; Journ. Agr. Univ. Puerto Rico, vol. 20, p. 536, 1936.

This small yellow or orange species is most easily recognized by having the head, from the dorsal aspect, one-half as long as wide, the scrobe cavity shallow, the apex of the antennal scape just reaching the level of the posterior ocelli, and the width of the head equal to the maximum dorsal width of thorax; there is an indistinct spot around the stigmal vein of the forewing. This species bears a superficial resemblance to some members of the genus *Decatoma*.

Description.—Yellowish or orange; venter of thorax, variable longitudinal mesal stripe on mesopraescutum, spot around stigmal vein, and most of abdomen, reddish brown.

Female: 3–4 mm. Apex of antennal scape reaching level of posterior ocelli, pedicel three-quarters and ring segment one-quarter length

of segment 4, segments 4 to 10 usually equal, somewhat variable, 11 and 12 slightly shorter than 10, 13 usually equal to 10; scrobe cavity shallow, carinate at ventral margin and ventral half of lateral margins, the latter strongly curved mesad; interantennal projection with a minute, vague anterior carina; frons minutely reticulated, almost glabrous ventrad of antennal bases, pubescence short, sparse; frontal tentorial pits located ventrad and laterad of antennal bases; width of malar space one-third height of compound eye; frontogenal suture slightly curved; combined widths of compound eyes equal to interocular width at level of antennal bases; left mandible with two acute teeth, dorsal one larger, right mandible with three teeth; diameter of posterior ocellus from slightly more than one-half to three-fifths width of interocellar space; head, from dorsal aspect, one-half as long as wide.

Dorsum of thorax with close irregular punctures, pubescence inconspicuous except at lateral margins of thorax, where it is slightly longer and stouter; anterolateral angles of pronotum mintely carinate; anterior dorsal margin acarinate; parapsidal furrows distinct; prepectus not visible; apex of mesoscutellum with a narrow, mesally depressed lamina; metepisternum covered by large, shallow punctures, pubescence short and fine; metacoxae with entire surface shagreened, setose on outer ventral side, sparsely so on dorsal; metafemora with outer surface minutely reticulated, pubescence short, sparse, ventral margin provided with 16 to 20 small, closely set teeth, basal one slightly larger; inner tooth sharp.

Propodeum usually entirely without setae, surface provided with strong carinae, areas between carinae glabrous, spiracular openings oblique, one very slight projection present at each posterolateral angle of propodeum; petiole two and one-quarter times as long as wide, entire surface shagreened and uneven, basal lamina wide, lateral carinae absent; gaster acuminate, slightly longer than metafemur, abdominal tergites 4 to 7 with long, sparse lateral setae; eighth tergite minutely and obscurely reticulated, setae long, sparse; spiracular openings round; cerci oval, located midway between anterior and posterior margins of epipygium; apex of ovipositor sheaths with a few short ventral setae.

Male: 2.5–3 mm. Antennal scape (fig. 8, *q*) enlarged in the middle; flagellum stout, segments usually as wide as long; width of malar space two-fifths height of compound eye; combined widths of compound eyes slightly less than interocular space at level of antennal bases; petiole four times as long as wide.

Type locality.—Florida.

Types.—Holotype, male, 51949, U. S. National Museum. The female was described as *Spilochalcis syrphidis* Wolcott, from Puerto

Rico; types, 51871, U. S. National Museum, and three specimens in the collection of the Puerto Rico Agricultural Experiment Station collection, Rio Piedras, P. R.

The type of *S. syrphidis* Wolcott differs only in sex from the type of *S. hirtifemora* (Ashmead).

Hosts.—*Mesogramma polita* (Say), *Mesogramma polygonastyla* (Metcalf), *Platychirus* sp. (Diptera, Syrphidae); *Apanteles marginiventris* (Cresson), *Apanteles* sp. (Hymenoptera, Braconidae).

Distribution.—District of Columbia, Florida, Georgia, Illinois, Ohio, Tennessee, Texas.

Cuba, Dominican Republic, Puerto Rico.

SPILOCHALCIS FEMORATA (Fabricius)

FIGURES 7, *f, j;* 8, *r;* 12, *i*

Crabro femoratus FABRICIUS, Systema entomologiae . . ., p. 375, 1775; Species insectorum . . ., vol. 1, p. 472, 1781; Mantissa insectorum . . ., vol. 1, p. 297, 1787.—OLIVIER, Encyclopédie méthodique, vol. 6, p. 518, 1791.

Vespa femorata (Fabricius) GMELIN, Systema naturae, ed. 13, vol. 1, p. 2765, 1790.

Smicra femorata (Fabricius) KIRBY, Journ. Linn. Soc. London, Zool., vol. 17, p. 86, 1883.

Spilochalcis femorata (Fabricius) HOWARD, Journ. Linn. Soc. London, Zool., vol. 25, p. 79, 1894; vol. 26, p. 130, 1897.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 384, 1898.—ASHMEAD, Trans. Ent. Soc. London, vol. 48, p. 336, 1900; Mem. Carnegie Mus., vol. 1, p. 326, 1904.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 39, 1909.—GOWDEY, Rept. Govt. Ent. Jamaica Dept. Agr. for 1920, p. 25, 1921.—WILSON, Rept. Ent. Virgin Islands Agr. Exp. Stat. for 1920, p. 21, 1921; St. Croix Agr. Exp. Stat. Bull. 3, p. 15, 1923; Virgin Islands Agr. Exp. Stat. Bull. 3, p. 5, 1923.—WOLCOTT, Journ. Dept. Agr. Puerto Rico, vol. 7, p. 61, 1923.—WINBURN and PAINTER, Journ. Kansas Ent. Soc., vol. 5, p. 7, 1923.—LUGINBILL, U. S. Dept. Agr. Techn. Bull. 34, p. 74, 1928—WOLCOTT, Journ. Agr. Univ. Puerto Rico, vol. 20, p. 536, 1936.

Sphex punctata FABRICIUS, Species insectorum . . ., vol. 1, p. 446, 1781.

Chalcis punctata (Fabricius) FABRICIUS, Mantissa insectorum . . ., vol. 1, p. 272, 1787.—GMELIN, Systema naturae, ed. 13, vol. 1, p. 2743, 1790.—OLIVIER, Encyclopédie méthodique, vol. 5, p. 438, 1790.—FABRICIUS, Entomologia systematica . . ., vol. 2, p. 196, 1793; Systema piezatorum . . ., p. 161, 1804.

Conura punctata (Fabricius) SICHEL, Ann. Soc. Ent. France, ser. 4, vol. 5, pp. 360, 392, 1865.

Smicra punctata (Fabricius) WALKER, Notes on Chalcidiae, p. 51, 1871.—CRESSON, Trans. Amer. Ent. Soc., vol. 4, p. 57, 1872.—CAMERON, Biologia Centrali-Americana, Hymenoptera, vol. 1, p. 87, 1884.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 35, 1885.

Smiera punctata (Fabricius) WOLCOTT, Journ. Dept. Agr. Puerto Rico, vol. 7, p. 63, 1923; Journ. Agr. Univ. Puerto Rico, vol. 20, p. 537, 1936.

Chalcis fasciata OLIVIER, Encyclopédie méthodique, vol. 5, p. 439, 1790.

Smiera subpunctata WALKER, Ent. Mag., vol. 2, p. 25, 1834; vol. 5, p. 469, 1838.—CRESSON, Proc. Ent. Soc. Philadelphia, vol. 1, p. 38, 1862.

Smicra subpunctata (Walker) CRESSON, Trans. Amer. Ent. Soc., vol. 4, p. 57, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 36, 1885.

Smiera nigropicta CRESSON, Proc. Ent. Soc. Philadelphia, vol. 4, p. 95, 1865; The Cresson types of Hymenoptera, p. 76, 1916.

Smicra nigropicta (Cresson) WALKER, Notes on Chalcidiae, p. 51, 1871.—CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 38, 53, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 35, 1885.

Smiera ignea CRESSON, Proc. Ent. Soc. Philadelphia, vol. 4, p. 92, 1865; The Cresson types of Hymenoptera, p. 75, 1916.

Smicra ignea (Cresson) WALKER, Notes on Chalcidiae, p. 51, 1871.—CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 37, 49, 192, 1872; HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 34, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 377, 1898.—ASHMEAD, Trans. Ent. Soc. London, vol. 48, p. 337, 1900.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 35, 1909.

Smicra mirabilis CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 38, 53, 192, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 35, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 379, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 35, 1909.—CRESSON, The Cresson types of Hymenoptera, p. 75, 1916.

This common tropical and subtropical species is most easily recognized by its very large compound eyes (fig. 7, *j*), the long and slender antennal flagellum with the three apical segments conspicuously shorter than the basal ones, the wide and deep scrobe cavity, and the usually large and acute basal tooth of the metafemur (fig. 12, *i*).

Description.—Yellow, orange, or red with variable black markings; dorsal side of flagellum, T-shaped mark on mesopraescutum, a longitudinal stripe on each lobe of mesoscutum, mesal angles of axillae, longitudinal mesal stripe on mesoscutellum, usually a round dorsal spot on outer dorsal surface of metacoxa, metatrochanters usually, outer ventral teeth and usually an apical spot on metafemur, variable mesal spot on propodeum, and usually apex of abdomen, black.

Female: 5.5–8 mm. Antennae inserted ventrad of center of frons (fig. 7, *f*), apex of scape exceeding level of posterior ocelli, pedicel five-eighths and ring segment one-eighth length of segment 4, segment 5 slightly shorter than 4, segments 5 to 10 gradually decreasing in length, so that segment 10 is only five-eighths length of 4, last three segments combined equal to third and fourth segments, exact shape of segments 12 and 13 variable, 12 usually much shorter than 11 or 13; scrobe cavity deep and wide, area of frons laterad of scrobe cavity very narrow (fig. 7, *f*); interantennal projection provided with a narrow anterior lamina; frons with lateral carinae, and provided with a few scattered punctures laterad of scrobe cavity and on lateral areas of frons ventrad of antennal bases, elsewhere minutely and obscurely reticulated; frontal tentorial pits located near anterior

margins of compound eyes, and dorsad of antennal bases (fig. 7, *f*); width of malar space one-third height of compound eyes, frontogenal suture extending directly from compound eye to mandible, paralleled by two strong carinae; combined widths of compound eyes slightly greater than interocular width at level of antennal bases; left mandible with two teeth, ventral one slightly larger, right mandible with three teeth, ventral one more acute and slightly larger than others; diameter of posterior ocellus slightly less than one-half interocellar space.

Dorsum of thorax deeply and densely pitted; pubescence short, inconspicuous; anterolateral angles of pronotum with an obscure carina, anterior dorsal margin acarinate; parapsidal furrows distinct; prepectus narrow, slightly overlapping anterior end of tegula; apex of mesoscutellum with a very narrow lamina, which is strongly depressed on meson; metepisternum strongly punctured except at anterior and posterior ventral angles, unpunctured areas glabrous or very faintly reticulated, pubescence fine, scattered; metacoxae glabrous on outer dorsal and inner surfaces, elsewhere shallowly punctured and setose; metafemora glabrous, sparsely covered with short setae, outer ventral margin with 12 to 20 small teeth, basal one larger than others, often long, acute (fig. 12, *i*); inner tooth acute, metatibia with apex long, slender, acute.

Propodeum with a few short, lateral setae, surface covered by irregular carinae, areas between carinae minutely reticulated, no lateral projections present, spiracular slits strongly arced; petiole short, usually shorter than wide, but occasionally slightly longer than wide, glabrous or very minutely reticulated, basal lamina wide on ventral side, narrower on dorsal side, slightly depressed on dorsal meson, interrupted at dorsolateral angles, lateral carinae usually present on petiole; gaster acuminate, one-third to one-half longer than metafemur, abdominal segments 4 to 7 each with a sparse row of short lateral setae; eighth tergite lightly shagreened, sparsely covered with short, black setae, spiracular openings round; cerci small, almost round, located near posterior margin of epipygium; apex of ovipositor sheaths densely covered with short setae.

Male: 5.6 mm. Antennal scape (fig. 8, *r*) broad at apex; malar space one-fourth height of compound eye; combined widths of compound eyes slightly less than interocular width at level of antennal bases; inner tooth of metafemur sharp; petiole twice as long as wide, with lateral carinae obscure or wanting.

Type locality.—West Indies.

Types.—*Chalcis* No. 8, Fabricius collection, University of Kiel, Kiel, Germany, 5 specimens. Comparisons made by Dr. Olaw Schroeder, June 1936. Types much broken and moldy, sex not discernible.

There is some doubt that *S. femorata* is the correct name to use for this species, although it is fairly clear that Fabricius himself [14] considered his species *Crabro femoratus* and *Chalcis punctata* the same. He used the name *punctata* for it in all his later works. The name *femorata*, however, has priority. Since Fabricius did not observe priority in the use of names proposed by other authors, it is not surprising to find that he did not observe priority in the use of his own names.

No specimens have been located that could be the types of *Crabro femoratus* Fabricius, so the specimens labeled *Chalcis punctata* in the Fabricius collection at Kiel University have been taken as the types. Dr. Olaw Schroeder has kindly made a detailed study of these types for me. He states that the specimens sent for comparison are, on the basis of the structural characters I asked him to examine, the same as the types.

Types for the synonyms: *punctata* Fabricius, type apparently the same as that of *femorata; fasciata* Olivier, lost; *subpunctata* Walker, lost; *nigropicta* Cresson, 1816.1–1816.6, Academy of Natural Sciences of Philadelphia; *ignea* Cresson, 1812, Academy of Natural Sciences of Philadelphia; *mirabilis* Cresson, 1792.1–1792.2, Academy of Natural Sciences of Philadelphia, and 1656, U. S. National Museum.

The available specimens of this species show distinct, but intergrading, differences in structure. Almost all the forms of this species, both the extremes and the intermediates, have already been described and named. I prefer to retain the single name for all of them, as no reliable means has been found for separating them. The species *Chalcis fasciata* Olivier and *Smiera subpunctata* Walker have been synonymized with *S. femorata* by Kirby [15] and as the types are lost, and the original descriptions show no reliable distinctions, they may as well be left in synonymy.

There are, in the Tropics, a great many species, both described and undescribed, closely related to this one. To judge from the collections of tropical Chalcididae I have seen, *S. femorata* is perhaps the commonest species of this group in the West Indies and Central America, particularly in cultivated areas.

Hosts.—I have seen no reared material of this species, but the following records of hosts have been published for *Spilochalcis femorata: Laphygma frugiperda* Abbot and Smith [Wilson], *Heliothis obsoleta* (Fabricius) [Winburn and Painter] (Lepidoptera, Noctuidae).

Distribution.—Florida, Georgia, Texas, Cuba, Haiti, Panama, Puerto Rico.

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[14] Entomologia systematica, vol. 2, p. 196, 1793.
[15] Journ. Linn. Soc. London, Zool., vol. 17, p. 66, 1883.

SPILOCHALCIS IGNEOIDES (Kirby)

FIGURES 8, *s*; 9, *t*

Smicra igneoides KIRBY, Journ. Linn. Soc. London, Zool., vol. 17, p. 71, 1883.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—SMITH, Geol. Surv. New Jersey, Catalogue of insects, p. 38, 1890.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 377, 1898.—SMITH, Ann. Rept. New Jersey State Board Agr., vol. 27, suppl., p. 553, 1900.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 35, 1909.

Smicra vittata ASHMEAD, Trans. Amer. Ent. Soc., vol. 12, p. x, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 234, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 383, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 36, 1909.

Spilochalcis vittata (Ashmead) GOSSARD, Florida Agr. Exp. Stat. Bull. 79, p. 288, 1905.—GILL, U. S. Dept. Agr. Dept. Bull. 371, p. 15, 1917; U. S. Dept. Agr. Farmers' Bull. 843, p. 21, 1917.—WILSON, Rept. Ent. Virgin Islands Agr. Exp. Stat. for 1921, p. 21, 1922; Virgin Islands Agr. Exp. Stat. Bull. 3, p. 21, 1923.—LUGINBILL, U. S. Dept. Agr. Techn. Bull. 34, p. 74, 1928.—WINBURN and PAINTER, Journ. Kansas Ent. Soc., vol. 5, p. 7, 1932.

Spilochalcis mesillae COCKERELL, Ann. Mag. Nat. Hist., ser. 6. vol. 19, p. 403, 1897.

At first glance this species seems quite distinct from all others, but it is actually difficult to find infallible characters to separate the females from those of *S. mariae* (Riley). The female of this species can best be recognized by the following characters: Body rather long and narrow, transverse carinae of mesopraescutum strong, abdomen acuminate, forewings with a brown spot around the stigmal vein, metafemur with a small inner tooth; the longitudinal mesal stripe of the mesonotum usually gradually widens anteriorly. In the male the scape is strongly incised (fig. 8, *s*), but the pedicel is cylindrical (fig. 9, *t*) rather than triangular as in *S. mariae* (fig. 9, *u*).

Description.—Yellow or red with black markings; scrobe cavity, usually two small spots on frons just ventrad of ocelli, mesal stripe between posterior ocelli, occipital area, usually meson of pronotum, usually a broad, longitudinal band extending from apex of mesoscutellum to anterior margin of mesopraescutum, parapsidal furrows, sometimes broad spots at anteromesal angles of lobes of mesoscutum, posterior margins of axillae, variable marks on mesopleuron, usually a dorsal stripe on metacoxa of female, with both a dorsal and ventral stripe in male, teeth of metafemur, usually a mesal stripe and areas around spiracles on propodeum, and apex of ovipositor sheath, black; male often with a black stripe on frontogenal suture; wings brownish, with a dark-brown spot surrounding stigmal vein.

Female: 4.5–8.5 mm. Antennal scape exceeding, by one-fifth its length, level of posterior ocellus, pedicel five-sixths and ring segment one-quarter length of segment 4, segment 4 slightly longer than

5, 5 to 8 equal, 9 and 10 slightly shorter, 11 and 12 combined equal to or slightly shorter than 10, 13 variable, usually minute; scrobe cavity shallow, margin indistinctly carinate at ventrolateral angles; one to three transverse carinae present in scrobe cavity just ventrad of anterior ocellus; interantennal projection with anterior carina continued up into scrobe cavity; frons with a few shallow pits near lateral margins, elsewhere minutely shagreened, several strong carinae extending laterad from anterior ocellus; frontal tentorial pits located just laterad of antennal bases; malar space usually slightly less than one-third height of compound eye, in large specimens, slightly wider; frontogenal suture almost straight; combined widths of compound eyes slightly greater than interocular space; left mandible with two teeth, right with three; diameter of posterior ocellus slightly less than two-thirds width of interocellar space.

Surface of pronotum and mesoscutellum shallowly punctured, areas between punctures lightly shagreened, remainder of dorsum of thorax provided both with carinae and irregular punctures; pubescence long, fine; anterolateral angles of pronotum carinate, anterior dorsal carina interrupted on mesal one-quarter to one-third, pronotum often with a carina at posterior margin on meson; prepectus narrow, apex not quite reaching tegula; apex of mesoscutellum with an extremely narrow, mesally depressed lamina; metepisternum shallowly pitted, areas between punctures almost glabrous, pubescence long; metacoxae glabrous on outer dorsal surface, covered with short setae on outer ventral surface, minutely shagreened near apex on ventral side; metafemur glabrous on outer surface, densely covered by short setae, ventral margin provided with 16 to 24 minute teeth, basal one slightly larger; small inner tooth present; apex of metatibia acute.

Propodeum with a few lateral setae, surface provided with strong mesal and apical carinae, laterobasal areas almost smooth, small tooth present at each posterolateral angle, spiracular openings oblique; petiole short, less than twice as long as wide, basal lamina narrow, lateral carinae usually present near base, but almost always becoming obsolete before apex; gaster one-third to one-half longer than metafemur; abdominal tergites 4 to 7 each with a double row of lateral setae; eighth tergite minutely shagreened, sparsely setose, spiracular openings oval, anterior margin often with a minute rounded projection; cerci small, oval, located near posterior margin of epipygium; apex of ovipositor sheaths with long setae.

Male: 4.5–6 mm. Inner margin of scape strongly incised (fig. 8, *s*), pedicel cylindrical (fig. 9, *t*), combined lengths of antennal segments 11 and 12 usually equal to segment 13; malar space always with a single long seta on each side of frontogenal suture, width of malar

space slightly less than one-third height of compound eye; combined widths of compound eyes one-fifth greater than interocular space at level of antennal bases; petiole slightly more than twice as long as wide; gaster usually equal in length to metafemur.

Type locality.—"United States."

Types.—Holotype, female, British Museum; comparisons made by Dr. Ch. Ferrière. Synonyms: *vittata* Ashmead, 40006, U. S. National Museum; *mesillae* Cockerell, 4075, U. S. National Museum.

Dr. Ch. Ferrière has kindly sent me detailed sketches and notes on the type of this species. The type of *S. vittata* Ashmead differs only in having the color markings very small and the transverse carinae of the mesopraescutum slightly weaker. The type of *S. mesillae* Cockerell is larger and has very broad color markings on the thorax, but otherwise it cannot be distinguished. I have a series of 54 specimens from localities all over the United States, and in this series all gradations are present between the form of *vittata*, with its small color bands, and *mesillae* with the color bands very broad.

The variation in coloration of this species seems to correlate very well with the mean temperatures of the localities where it has been collected, as the specimens from either high elevations or northern localities have very broad markings, while specimens from southern localities or low altitudes have the color bands narrow. This variation in color does not seem to correlate with variations in humidity, as specimens from the deserts of southern New Mexico or California are identical in coloration with specimens from the coast of Massachusetts.

Hosts.—I have seen no reared material of this species, but the following host records have been published under the name *Spilochalcis vittata: Mineola indigenella* Zeller [Gossard] (Lepidoptera, Pyralidae); *Laphygma frugiperda* Abbot and Smith [Wilson], *Heliothis obsoleta* (Fabricius) [Winburn and Painter] (Noctuidae).

Distribution.—Alberta, California, Florida, Georgia, Illinois, Indiana, Kansas, Massachusetts, Montana, New Hampshire, New Jersey, North Carolina, Oklahoma, Rhode Island, South Dakota, Texas, Virginia.

SPILOCHALCIS MARIAE (Riley)

FIGURES 8, *t;* 9, *u;* 10, *k;* 12, *j*

Chalcis mariae RILEY, Amer. Ent., vol. 2, p. 101, 1870; 4th annual report on the noxious, beneficial and other insects of the State of Missouri, p. 109, 1872.—GENTRY, Can. Ent., vol. 9, p. 50, 1877.—BRUNER, Nebraska Agr. Exp. Stat. Bull. 14, p. 140, 1890; Rept. Nebraska State Hort. Soc. for 1891, p. 220, 1892; Preliminary introduction to the study of entomology, p. 101, 1894.

Smicra mariae (Riley) CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 38, 52, 1872.—GLOVER, Illustrations of North American entomology, pl. 1, fig. 33, 1878.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—SMITH, Geol. Surv. New Jersey, Catalogue

of insects, p. 38, 1890.—Howard, Proc. Ent. Soc. Washington, vol. 1, p. 11, 1895.—Smith, Ann. Rept. New Jersey State Board Agr., vol. 27, suppl., p. 554, 1900.—Girault, Ent. News, vol. 25, p. 283, 1914.

Spilochalcis mariae (Riley) Howard, U. S. Dept. Agr. Bur. Ent. Bull. 5, pp. 6, 35, 1885.—Dalla Torre, Catalogus hymenopterorum, vol. 5, p. 285, 1898.—Viereck, Trans. Amer. Ent. Soc., vol. 32, p. 184, 1906.—Howard and Chittenden, U. S. Dept. Agr. Circ. 97, p. 7, 1908.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 40, 1909.—Smith, Ann. Rept. New Jersey State Mus. for 1909, p. 649, 1910.—Viereck, Connecticut Geol. and Nat. Hist. Surv. Bull. 22, p. 527, 1916.—Howard and Chittenden, U. S. Dept. Agr. Farmers' Bull. 701, p. 7, 1916.—Ruhl, Soc. Ent. Stuttgart, vol. 36, p. 11, 1921.—Baerg, Ontario Dept. Agr. Bull. 224, p. 8, 1928.—Isely, Arkansas Agr. Exp. Stat. Bull. 203, p. 32, 1926.—Leonard, Cornell Univ. Agr. Exp. Stat. Mem. 101, p. 976, 1928.—Johnson, Nantucket Maria Mitchell Assoc. Publ. 3, p. 109, 1930.—Montgomery, Can. Ent., vol. 65, p. 185, 1933.—Schaffner and Griswold, U. S. Dept. Agr. Misc. Publ. 188, p. 152, 1934.

Spilochalcis trinidadensis Ashmead, Mem. Carnegie Mus., vol. 1, p. 437, 1904.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 41, 1909.

Spilochalcis insularis Ashmead, Mem. Carnegie Mus., vol. 1, p. 437, 1904.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 40, 1909.

The male of this species differs from all other North American species in the genus in having the antennal pedicel triangular instead of cylindrical (see fig. 9, *u*); the female is most easily recognized by the quite constant color pattern of the dorsum of the thorax, the short, stout petiole, with distinct lateral carinae, and the metafemora being without an inner tooth.

Description.—Yellow or red with black markings; flagellum of antennae, occiput, mesal spot on anterior surface of pronotum, anterior and posterior margins and longitudinal mesal stripe of mesopraescutum, parapsidal furrows, longitudinal mark on each lobe of mesoscutum, posterolateral angles of axillae, longitudinal mesal stripe of mesoscutellum, variable dorsal stripe or spot and apex of metacoxae, metatrochanters usually, teeth of metafemur, variable basal spot of propodeum, usually narrow transverse dorsal stripes on gaster, and apex of ovipositor sheaths, black; male almost always with both a dorsal and ventral black stripe on metacoxae.

Female: 4.5–10 mm. Apex of antennal scape exceeding, by one-fourth its length, level of posterior ocelli, scape and ring segment usually equal in length, their combined lengths equal to segment 4, segments 4 to 7 usually equal, 7 sometimes slightly shorter, 8 and 9 always shorter than 7, 10 variable in length, usually slightly shorter than 9, last three segments indistinctly divided, their combined lengths usually equal to segment 4; scrobe cavity shallow, edge carinate at ventral margin and on ventral one-half of lateral margins, the latter strongly curved mesad; interantennal projection with a slight anterior carina; frons with a few scattered, indistinct punctures, oblique carinae radiating from ventral and lateral margins of anterior ocellus, usually three transverse carinae present in scrobe

cavity just ventrad of antennal bases; frontal tentorial pits located very near antennal bases, at level of ventral margin of scrobe cavity; width of malar space approximately one-third height of compound eye; frontogenal suture straight; combined widths of compound eyes four-fifths interocular width at level of antennal bases; left mandible with two teeth, right with three; diameter of posterior ocellus usually two-thirds interocellar width, sometimes slightly less; vertex strongly depressed between posterior ocelli.

Dorsum of thorax scatteringly covered by punctures and short, slightly irregular transverse carinae; pubescence indistinct; anterolateral angles of pronotum carinate, anterior dorsal margin with carina varying from strong to weak, this carina interrupted on mesal one-eighth to one-third; parapsidal furrows distinct; prepectus usually concealed, occasionally visible as a very narrow, bladelike sclerite extending to tegula; apex of mesoscutellum with a minute lamina which is strongly depressed on meson; metepisternum partly glabrous, anteroventral angle sometimes minutely shagreened, a few shallow punctures present; metacoxae completely glabrous, sparsely covered by rather long pubescence except on outer dorsal surface; metafemur (fig. 12, *j*) glabrous on outer surface, densely covered by short pubescence, ventral margin with 14 to 22 small, closely set teeth, the basal one larger; inner tooth wanting; metatibia with apex narrow, acute.

Propodeum with two lateral areas at base covered by minute, irregular reticulations, well-developed carinae on meson and at apex, a blunt lateral projection present on either side of point of insertion of petiole, spiracular openings vertical; petiole usually as wide as long, occasionally slightly longer, basal lamina narrow, distinct lateral carinae present, area of petiole ventrad of lateral carinae lightly shagreened; gaster one-third to one-half longer than metafemur, abdominal tergites three to seven each with a sparse row of lateral setae; eighth tergite minutely shagreened, sparsely covered by long setae, spiracular openings oval; cerci oval, small, located near posterior margin of epipygium, usually provided with five long setae; apex of ovipositor sheath densely covered with short setae.

Male: 4–7 mm. Mesal margin of antennal scape strongly incised (fig. 8, *t*), pedicel triangular (fig. 9, *u*); width of malar space one-quarter height of compound eye; combined widths of compound eyes equal to width of interocular space at level of antennal bases; petiole slightly longer than wide at widest point; cerci large, located midway between base and apex of ninth tergite.

Type locality.—Missouri.

Types.—Holotype, female, 2788, U. S. National Museum; the allotype has apparently been lost, although both the male and female were mentioned in the original description. Synonyms: *trinidaden-*

sis Ashmead, H. H. Smith collection, Carnegie Museum; *insularis* Ashmead, H. H. Smith collection, Carnegie Museum.

The types of *S. trinidadensis* and *S. insularis* Ashmead are slightly smaller and more lightly colored than the typical *S. mariae*, but otherwise they do not differ. Size and color differences alone are not reliable specific differences in this genus.

Hosts.—*Thyridopteryx ephemeraeformis* Haworth (Lepidoptera, Psychidae); *Philosamia cynthia* Drury, *Samia cecropia* (Linnaeus), *Callosamia promethea* Drury, *Telea polyphemus* Cramer, *Rothschildia* sp. (Saturniidae).

Distribution.—Arizona, Colorado, District of Columbia, Florida, Georgia, Illinois, Kansas, Louisiana, Maryland, Missouri, New Jersey, New York, North Carolina, Pennsylvania, South Carolina, Texas, Virginia, Wisconsin.

Trinidad, B. W. I.

SPILOCHALCIS CLORA, new species

FIGURE 9, *a*

This species differs only slightly from *S. mariae* (Riley) redescribed on page 304.

Description.—Female: Unknown.

Male: 3.5–4 mm. Identical with the male of *S. mariae* (Riley) except in the following characters: Antennal scape narrow at base, broadened somewhat at apex (fig. 9, *a*), apex only shallowly excavated, outer anterior angle rounded, rather than acutely produced, as in *S. igneoides* (Kirby) (fig. 8, *s*) or *S. mariae* (Riley) (fig. 8, *t*); pedicel cylindrical, three-fourths the length of segment 4, ring segment one-half the length of 4, segments 5 to 10 equal in length, only slightly longer than wide, last three segments slightly shorter than 10; width of malar space three-fourths the height of compound eye; frontogenal suture slightly curved; combined widths of compound eyes one-sixth to one-fifth wider than interocular space at level of antennal bases; diameter of posterior ocellus one-half the interocellar width; outer surface of metafemur slightly reticulated near dorsal margin, glabrous ventrad, ventral margin with 16 to 18 minute, closely set teeth; inner tooth lacking; petiole twice as long as wide, basal lamina narrow, lateral carinae present only near base; gaster equal in length to metafemur.

Type locality.—Texas.

Types.—Holotype, male, College Station, Tex., September, Banks; paratypes, Mission, Tex., December 5, 1910, 2 males; Scott County, Ark., August 23, 1928, R. H. Beamer, 1 male. Holotype deposited in the U. S. National Museum, two paratypes in Illinois State Natural History Survey collection, one paratype in Kansas State College, Manhattan, Kans.

A good series of material from the Southwestern States is needed so that it will be possible to associate the females of this species with these males.

Host.—Unknown.

SPILOCHALCIS PHAIS, new species

FIGURE 9, *b*

This species differs only slightly from *S. mariae* (Riley) redescribed on page 304.

Description.—Female: 5–6.5 mm. Except for the characters mentioned in key above, identical with female of *S. mariae.*

Male: 4–5 mm. Identical with the male of *S. mariae*, except in the following characters: Anteromesal margin of antennal scape only slightly sinuate near apex (fig. 9, *b*), not strongly incised as in *S. igneoides* (Kirby) (fig. 8, *s*) or *S. mariae* (fig. 8, *t*), scape broadened from base to apex, apex deeply excavated, outer anterior apex rounded, rather than acutely produced, as in *S. mariae* (fig. 8, *t*); pedicel cylindrical, two-thirds the length of segment 4, ring segment one-quarter the length of segment 4, segments 5 to 10 equal, somewhat variable, usually longer than wide, last three segments slightly shorter than 10; width of malar space three-tenths the height of compound eye; frontogenal suture slightly curved; combined widths of compound eyes equal to or slightly greater than interocular space at level of antennal bases; diameter of posterior ocellus one-half the width of interocellar space; outer surface of metafemur glabrous, ventral margin provided with 12 to 18 minute, closely set teeth; petiole slightly less than twice as long as wide, basal lamina narrow, lateral carinae wanting; gaster slightly longer than metafemur.

Type locality.—Texas.

Types.—Holotype, male, Brownsville, Tex., May 1921, J. C. Bridwell; paratypes, Brownsville, Tex., May 1921, J. C. Bridwell, 1 male, C. H. T. Townsend, 409, 1 male, Victoria, Tex., 1 male, Maverick County, Tex., December 29, 1915, J. D. Mitchell, 1 male. All types deposited in the U. S. National Museum.

Host.—The specimen collected by J. D. Mitchell in Maverick County, Tex., was reared from the pupa of a moth probably belonging to the family Ceratocampidae, although this host pupa is too poorly preserved to be identified accurately.

The xanthostigma Group

The *xanthostigma* group includes the genotype of *Spilochalcis.* Most of the species of *Spilochalcis* described from India and Africa are also apparently referable to this group. All the species of this group are rather rare, but most of them are widely distributed.

Aside from the short antennal scape, this group is recognized by the stout flagellum and the head being, when viewed from the dorsal aspect, nearly one-half as long as wide. The vertex is broadly rounded so that the anterior ocellus is directed somewhat dorsad rather than in the usual anterior direction; the thorax is, in all but one species in this area, quite compact and broad (fig. 10, *c*). The teeth of the metafemora are invariably minute and closely set, and the basal tooth is usually no larger than the following ones.

KEY TO SPECIES OF THE XANTHOSTIGMA GROUP

1. Female, ninth abdominal sternite concealed, antennal scape slender 2
   Male, ninth abdominal sternite exposed, antennal scape broad 10
2. Abdomen greatly elongated, acuminate, dorsal length of epipygium twice as great as length of eighth tergite ..... tanais (p. 309)
   Abdomen short, dorsal length of epipygium equal to or slightly less than length of eighth tergite 3
3. Left mandible with three teeth ..... juxta (p. 311)
   Left mandible with two teeth 4
4. Interantennal projection with a thin, conspicuously projecting anterior lamina (as in fig. 7, *g*) ..... arcana (p. 313)
   Interantennal projection either smooth or with a minute anterior carina 5
5. Dorsum of pronotum with a distinct anterior carina (fig. 10, *c*) 6
   Dorsum of pronotum acarinate at anterior margin 7
6. Petiole less than twice as long as wide ..... apaiis (p. 315)
   Petiole three times as long as wide ..... melana (p. 316)
7. Outer dorsal surface of metacoxa glabrous 8
   Outer dorsal surface of metacoxa shagreened 9
8. Lateral ocelli almost contiguous with compound eyes ..... pallens (p. 319)
   Lateral ocelli separated from margins of compound eyes by a space at least equal to diameter of ocellus ..... xantha (p. 320)
9. Width of space between posterior ocellus and margin of compound eye less than diameter of posterior ocellus ..... odontotae (p. 321)
   Width of space between posterior ocellus and margin of compound eye greater than diameter of posterior ocellus ..... subobsoleta (p. 323)
10. Thorax elongate, slender (fig. 10, *b*), width of posterior margin of mesopraescutum two-fifths its length ..... tanais (p. 309)
    Thorax short, compact (fig. 10, *c*), width of posterior margin of mesopraescutum one-half its length 11
11. Left mandible with three teeth ..... juxta (p. 311)
    Left mandible with two teeth 12
12. Interantennal projection with a thin, conspicuously projecting anterior lamina (as in fig. 7, *g*) ..... arcana (p. 313)
    Interantennal projection either smooth or with a minute carina 13
13. Outer dorsal surface of metacoxa glabrous 14
    Outer dorsal surface of metacoxa shagreened 15
14. Lateral ocelli almost contiguous with compound eyes ..... pallens (p. 319)
    Lateral ocelli separated from margins of compound eyes by a space at least equal to diameter of ocellus ..... lecta (p. 317)

15. Anterior dorsal margin of pronotum with a transverse carina (fig. 10, *c*) ---------- melana (p. 316)
Anterior dorsal margin of pronotum acarinate ---------- 16
16. Width of space between posterior ocellus and margin of compound eye one-third diameter of posterior ocellus ------ odontotae (p. 321)
Width of space between posterior ocellus and margin of compound eye equal to or slightly greater than diameter of posterior ocellus ---------- 17
17. Frontal tentorial pits located near bases of antennae; dorsum of thorax black with yellow spots ---------- subobsoleta (p. 323)
Frontal tentorial pits located midway between antennal bases and anterior margins of compound eyes; dorsum of thorax entirely black ---------- pallipes (p. 325)

SPILOCHALCIS TANAIS, new species

FIGURES 9, *c*; 10, *b*

In having the antennal scape short, the flagellum stout, and the vertex broadly rounded, this species agrees with *S. subobsoleta* (Cresson) but differs in having the scrobe cavity shallow, the body elongate rather than compact, the abdomen of the female acuminate instead of semiglobose, the mesopraescutum as long as wide at the widest point (fig. 10, *b*), not wider than long (fig. 10, *c*), and the metafemora rather narrow instead of semiglobose.

Description.—Yellow with variable brown and black markings. The following areas usually brown: Apices of mandibles, areas of frons just cephalad of ocelli, occiput, mesal and two lateral spots on dorsum of pronotum, all but lateral margins of mesoscutum and praescutum, axillae except mesal angles, mesal area of mesoscutellum, most of ventral and lateral areas of thorax, metacoxae, and metafemora except basal, apical, and dorsal spots, lateral margins and meson of propodeum, and transverse dorsal stripe on each segment of gaster. The following parts usually black: Mesal stripe between posterior ocelli, occiput near cervicum, longitudinal mesal stripe on mesopraescutum and scutellum, variable marks on pleura, cephaloventral angle of metepisternum, small area ventrad of propodeal spiracles, transverse stripes on eighth tergite and base of epipygium, and apex of ovipositor sheath.

Female: 4–6 mm. Apex of antennal scape not quite reaching level of ventral margin of anterior ocellus, pedicel three-quarters and ring segment one-quarter length of segment 4, segment 5 slightly shorter than 4, segments 5 to 10 decreasing progressively in length, so that 10 is one-quarter shorter than 4, 11 and 12 variable, usually equal to 10, 13 one-half or less length of 10; scrobe cavity shallow, edge carinate only at ventral margin; interantennal projection with a minute dorsal carina; frons pitted lateral to scrobe cavity and on narrow lateral areas ventrad of antennal bases, elsewhere minutely reticulated, uni-

formly but sparsely covered by rather long setae; frontal tentorial pits located slightly ventrad and laterad of antennal bases; width of malar space slightly less than one-third height of compound eye; frontogenal suture almost straight; combined widths of compound eyes almost equal to interocular width at level of antennal bases; left mandible with two teeth, right with three; diameter of posterior ocellus three-sevenths interocellar width.

Dorsum of thorax shallowly and irregularly pitted, punctures lacking along anterior margin of mesopraescutum, areas between pits minutely reticulated; pubescence long, dense at posterior margin of pronotum, on meson and at posterior margin of mesopraescutum, parapsidal furrows, and lateral margins of mesoscutellum; anterolateral angles of pronotum slightly carinate, anterior dorsal margin with a minute carina which is interrupted on mesal one-third; parapsidal furrows distinct; only a small triangular area of prepectus visible at anterolateral angles of mesoscutum; mesoscutellum with a very narrow apical lamina; metepisternum thickly punctured and densely covered by long setae; metacoxa almost glabrous on outer dorsal and inner surfaces, elsewhere shallowly punctured and setose; metafemur with outer surface minutely reticulated, densely covered by short setae; outer ventral margin with 12 to 15 small teeth, basal one slightly larger than others; blunt inner tooth present.

Propodeum with strong mesal and apical carinae, elsewhere minutely shagreened, a small tooth present at each posterolateral angle, spiracular openings vertical; petiole short, only one and one-half times as long as wide, dorsal surface glabrous, basal lamina narrow, short lateral carinae present near base; gaster one-fourth to one-third longer than metafemur, abdominal segments 5 to 7 each with a pair of lateral patches of setae, segments 4 to 7 each with a double row of setae on dorsal surface; eighth tergite minutely reticulated, covered by rather long pubescence, spiracular openings round; epipygium conspicuously setose, cerci oval, situated near posterior margin of epipygium; apex of ovipositor sheaths with dense, short, ventral setae.

Male: 4 mm. Antennal scape (fig. 9, *c*) slightly shorter than in female; width of malar space one-third height of compound eye; combined widths of compound eyes equal to interocular space; inner tooth of metafemur small, obscure; petiole twice as long as wide.

Type locality.—California.

Types.—Holotype, female, Saticoy, Calif., November 29, 1930, ex *Gnorimoschema* sp. pupa on *Solanum;* allotype, male, Childress, Tex., September 9, 1908, ex *Gnorimoschema* sp. pupa from stem of *Polygonum pennsylvanicum*, Hunter No. 1082, E. S. Tucker; paratypes, Brownsville, Tex., November 19, 1911, in pasture in southern Texas gardens, 1 female, November 23, 1910, sweeping on Indian Plains,

1 female. Holotype and allotype deposited in the U. S. National Museum; paratypes deposited in Illinois State Natural History Survey collection.

Host.—Gnorimoschema sp. (Lepidoptera, Gelechiidae).

SPILOCHALCIS JUXTA (Cresson)

FIGURES 7, *g*; 9, *d*

Smicra juxta CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 38, 54, 1872.—CAMERON, Biologia Centrali-Americana, Hymenoptera, vol. 1, p. 87, 1884.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 34, 1885.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 378, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 35, 1909.—CRESSON, The Cresson types of Hymenoptera, p. 75, 1916.

Spilochalcis nigropleuralis ASHMEAD, Mem. Carnegie Mus., vol. 1, p. 436, 1904.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 40, 1909.

This compact species is most readily recognized by its rounded head, which is one-half as long as wide when viewed from the dorsal aspect, the stout antennal flagellum, and the strong lamina projecting cephalad from the interantennal projection (fig. 7, *g*).

Description.—Yellow with black markings; antennal flagellum dark brown, the three apical segments usually red; occipital area of head, all but lateral margins of mesopraescutum and lobes of mesoscutum, anterior basal areas of axillae, mesal longitudinal stripe of mesoscutellum, apices of metacoxae, small basal, apical, and ventral rectangular marks on outer side of metafemur, most of propodeum, entire petiole, and most of gaster, black.

Female: 4.5–5 mm. Apex of antennal scape not quite attaining level of ventral margin of anterior ocellus, pedicel four-fifths and ring segment one-fifth length of segment 4, 4 to 10 equal in length, 11, 12, and 13 shorter, their combined lengths one-fifth less than length of segments 9 and 10; scrobe cavity deep, edge carinate only at ventral margin; interantennal projection provided with a conspicuous anterior lamina (fig. 7, *g*); frons with area between scrobe cavity and compound eyes somewhat produced cephalad, surface of frons densely punctured except immediately dorsad of clypeus; frontal tentorial pits usually obscure, located at level of ventral margin of scrobe cavity; malar space one-third height of compound eye; frontogenal suture extending in a low arc from compound eye to mandible, a strong secondary carina extending from point near dorsal articulation of mandible to posterior margin of compound eye; combined widths of compound eyes equal to interocular space at level of antennal bases; left mandible with three nearly equal teeth, right mandible with three teeth, ventral one largest; diameter of posterior ocellus three-fourths width of interocellar space.

Dorsum of thorax coarsely punctate, spaces between punctures narrow, minutely reticulated; pubescence long, generally sparse on meson

of dorsal area; anterolateral margins of pronotum strongly carinate; anterior dorsal carina interrupted on mesal one-fifth; prepectus narrow, tongue-shaped, extending to tegula; anterior margin of mesoscutellum with a minute mesal notch, apex of mesoscutellum with a narrow, mesally depressed lamina; metepisternum strongly punctured, pubescence long and dense; metacoxa rather squarely truncate at base, surface glabrous, provided with sparse, short pubescence on ventral side; outer surface of metafemur densely covered by short pubescence, from 17 to 24 small, blunt, closely set teeth present on ventral margin; distinct inner tooth present.

Propodeum provided with a few large carinae, two lateral areas at base minutely shagreened, a small tooth present at each posterolateral angle, spiracular openings nearly vertical; petiole slightly more than twice as long as wide at widest point, basal lamina wide on ventral side, slightly narrower on dorsal side; prominent lateral grooves usually present; gaster slightly longer than metafemur, third abdominal segment usually as long as all following segments combined, lateral row of setae usually present only on segment 4, although some specimens have a few lateral setae on segment 6 or 7; eighth tergite minutely reticulated, sparsely pubescent; spiracular openings minute, round; cerci oval, located near posterior margin of epipygium and provided with five to seven long setae; apices of ovipositor sheaths with a few ventral setae.

Male: 4–4.5 mm. Antennal scape (fig. 9, *d*) stout; combined widths of compound eyes one-third less than width of interocular space at level of antennal bases; petiole two and one-half times as long as wide.

Type locality.—Mexico.

Types.—Holotype, female, 1808.1; paratype, 1808.2: Academy of Natural Sciences of Philadelphia. Synonym: *nigropleuralis* Ashmead, H. H. Smith collection, Carnegie Museum.

The types of *nigropleuralis* Ashmead differ very slightly from those of *S. juxta* Cresson in the distinctness of the carinae of the genae. The available material shows this difference to intergrade.

Host.—Unknown.

Distribution.—Illinois: Monticello, June 11, 1934, Frison and DeLong, 1 male. Kansas: Atchison County, July 11, 1924, R. H. Beamer, 1 male. Maryland: Cabin John, September 2, 1914, R. C. Shannon, 1 female. Texas: Brownsville, February 8, 1926, P. A. Glick, 1 male.

Mexico: Sumichrast, 2 females (holotype and paratype); Matamoros, August 10–12, 1903, W. L. Tower, 1 female, 1 male.

Trinidad, B. W. I.: 1 female, 1 male (cotypes of *nigropleuralis* Ashmead).

Brazil: Chapada, 1 female (cotype of *nigropleuralis* Ashmead).

SPILOCHALCIS ARCANA (Cresson)

FIGURE 9, *e*

Smicra arcana CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 36, 44, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 33, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 373, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 34, 1909.—CRESSON, The Cresson types of Hymenoptera, p. 74, 1916.

Smicra encausta CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 37, 46, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 34, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 376, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 35, 1909.—CRESSON, The Cresson types of Hymenoptera, p. 74, 1916.

This usually red or orange species is most easily recognized by its compact form, short antennal scape and stout flagellum, very broad anterolateral carina of the pronotum, prominent anterior lamina on the interantennal projection, and the semiglobose metafemora with 18 or more small, closely set teeth, the basal one of which is acute.

Description.—Red, orange, or yellow with broad black marks; vertex and occiput, mesopraescutum except two wedge-shaped lateral marks, lobes of mesoscutum except anterolateral angles, axillae, narrow longitudinal mesal and short apical marks on mesoscutellum, metacoxae except small dorsal stripe, central and small apical spots on outer side of metafemur, entire propodeum, petiole, and gaster, except bases of third and fourth segments, black.

Female: 4–5 mm. Apex of antennal scape not quite reaching level of ventral margin of anterior ocellus, pedicel four-fifths and ring segment two-fifths length of segment 4, 5 slightly shorter than 4, 5 to 11 almost equal in length, 12 and 13 combined only slightly longer than 11; scrobe cavity deep, edge carinate at ventral margin; interantennal projection provided with a strong anterior lamina; frons deeply and closely punctured, punctures tending to coalesce so as to form irregular transverse and oblique carinae, frontal tentorial pits located just laterodorsad of antennal bases; width of malar space slightly less than one-half height of compound eye; frontogenal suture extending, for one-fourth its length, ventrad from compound eye, then curved abruptly toward mandible, genal area caudad of suture with three or four irregular transverse carinae; combined widths of compound eyes two-thirds interocular width at level of antennal bases; left mandible with two rather blunt teeth, right mandible with three acute teeth, ventral one largest; diameter of posterior ocellus slightly less than one-half interocellar width.

Dorsum of thorax deeply and thickly punctured, areas between punctures minutely reticulated; pubescence mostly short, but longer at posterior margins of pronotum and mesopraescutum; anterolateral angles of pronotum with a wide lamina, anterior dorsal carina interrupted on mesal one-fifth; parapsidal furrows nearly obliterated; prepectus narrow, its apex slightly overlapping anterior apex of tegula; mesoscutellum provided with a narrow apical lamina; metepisternum densely and deeply punctured, sparsely covered by long, slender setae; metacoxa stout, outer dorsal area glabrous or very nearly so, ventral and lateral areas provided with setae and large punctures; outer surface of metafemora densely covered by short pubescence, ventral margin with 19 to 24 small, acute, closely set teeth, basal one slightly larger and acute; inner tooth varying from acute to blunt; metatibia with apex acute.

Propodeum covered by strong, rather irregular carinae, a minute tooth present at each posterolateral angle, spiracular openings nearly vertical; petiole short, glabrous on dorsal side, minutely reticulated on lateral side near base, basal lamina narrow; gaster somewhat compressed, usually slightly smaller than metafemur, third abdominal segment usually occupying half or more total length of gaster, abdominal segments 4 to 7 with sparse lateral setae at posterior margins; eighth tergite minutely pitted and reticulated, sparsely covered by long setae, spiracular openings round; cerci small, almost round, located midway between anterior and posterior margins of epipygium; ovipositor sheaths provided with sparse, short ventral setae.

Male: 4.5–5 mm. Antennal scape (fig. 9, *e*) short and stout; combined widths of compound eyes one-half interocular space at level of antennal bases; inner tooth of metafemur sharp; petiole slightly more than twice as long as wide.

Type locality.—Delaware.

Types.—Holotype, male, 1786, Academy of Natural Sciences of Philadelphia. The female was described as *Smicra encausta* Cresson, from Colorado; type, 1789, Academy of Natural Sciences of Philadelphia.

The species *S. encausta* Cresson was originally stated to be described from a male, but the type is a female; it differs from the type of *S. arcana* only in having the anterolateral lamina of the pronotum slightly narrower, but is otherwise identical in structure (except in primary and secondary sexual characters), although somewhat darker in color. Neither of these differences is of specific value.

Host.—Unknown.

Distribution.—Alabama, Colorado, Delaware, Illinois, Manitoba, Minnesota, Montana, North Dakota.

SPILOCHALCIS APAIIS, new species

FIGURE 10, *c*

In having the antennal scape short and the flagellum stout, while the head, from the dorsal aspect, is almost one-half as long as wide, this species agrees with *S. juxta* (Cresson) but differs in that the left mandible has only two teeth instead of three, the dorsum of the thorax is flattened, and the metacoxae and femora are minutely shagreened instead of glabrous.

Description.—Black; the following areas yellow: Frons laterad of scrobe cavity, genae, dorsal meson of pronotum, lateral margins of mesopraescutum and mesoscutum, mesal angles of axillae, basal and lateral margins of mesoscutellum, apices of profemora and metafemora, all tibiae and tarsi, and subapical spot on outer ventral margin of metafemora; the following areas orange: Scape, pedicel, and segments 3 to 5 of antennae, narrow band across vertex, dorsolateral areas of pronotum, anteromesal areas of mesopraescutum, small mesal spots on lobes of mesoscutum, subbasal area of mesoscutellum, outer dorsal side of metacoxae, outer surface of metafemora, apex of propodeum, and transverse dorsal stripes on abdominal segments 3 and 4.

Female: 2.5–3 mm. Apex of antennal scape not quite reaching level of ventral margin of anterior ocellus, pedicel one-third longer than segment 4, ring segment one-sixth length of pedicel, segment 5 one-fifth longer than 4 and slightly longer than 6, 6 to 11 equal, 12 and 13 slightly shorter; scrobe cavity deep, and inconspicuous carina present on ventral half of each lateral margin, a short transverse carina present in scrobe cavity just ventrad of anterior ocellus; interantennal projection strongly produced cephalad but without a carina or lamina, frons deeply and densely pitted on area laterad of scrobe cavity, scatteringly punctured on lateral areas ventrad of antennal bases, impunctate on meson, pubescence long, scattered; frontal tentorial pits located just laterad of antennal bases; width of malar space one-third height of compound eye; frontogenal suture slightly arced, almost straight; combined widths of compound eyes four-fifths or slightly more width of interocular space at level of antennal bases; left mandible with two teeth, right with three; width of interocellar space two and two-fifths times the diameter of posterior ocellus; head, from dorsal aspect, slightly less than one-half as long as wide.

Dorsum of thorax (fig. 10, *c*) flattened, thickly covered with shallow, irregular punctures, area at anterior margin of mesopraescutum not punctured but shagreened; pubescence long, white or yellow; anterolateral angles of pronotum carinate, carina of anterior dorsal margin interrupted on mesal one-third; parapsidal furrows distinct; prepectus narrow, just reaching tegula; apex of mesoscutellum with

a narrow flange, which is only slightly depressed on meson; metepisternum with large, deep pits, pubescence long, sparse; metacoxa minutely shagreened on outer dorsal side, ventral side with short setae; outer surface of metafemora densely covered with short setae, 15–25 small, acute teeth present on ventral margin; inner tooth acute.

Propodeum provided with strong mesal and apical carinae, two basolateral areas more weakly and irregularly carinate, areas between carinae minutely reticulated, spiracular openings slightly slanted laterad, propodeum with a small projection at each posterolateral angle; petiole slightly less than twice as long as wide, all exposed surfaces with minute shagreening and short carinae, basal lamina narrow, interrupted at dorsolateral angles, lateral carinae present; gaster slightly longer than metafemur, abdominal tergites 4 to 7 with sparse lateral setae; eighth tergite minutely reticulated, sparsely setose, spiracular openings round; cerci oval, located midway between anterior and posterior margins of epipygium; apex of ovipositor sheath with a few short setae.

Male: Unknown.

Type locality.—Texas.

Types.—Holotype, female, Brownsville, Tex., May 26, 1919, C. Heinrich; paratypes, same data as holotype, 4 females. All types deposited in the U. S. National Museum.

Host.—Unidentified microlepidopteron on *Lantana horrida.*

SPILOCHALCIS MELANA, new species

FIGURE 9, *g*

This minute, black species bears a superficial resemblance to *S. side* (Walker), but the presence of a frontogenal suture in *S. melana* will separate them at once. This species is structurally close to *S. apaiis*, described above, in having the scape short, head broadly rounded, anterior margin of pronotum carinate, and the thorax broad and somewhat flattened (as in fig. 10, *c*); it differs in being almost entirely black instead of varicolored, having the petiole three times as long as wide (rather than only twice as long as wide), and having a minute carina on the interantennal projection.

Description.—Black; mandibles, antennal scape, protibiae, mesotibiae, and all tarsi, yellow. Conspicuously covered with long, white setae.

Female: 2 mm. Apex of antennal scape not reaching level of ventral margin of anterior ocellus, pedicel one and one-half and ring segment one-third length of segment 4, segments 5 to 10 equal, as wide as long, last three slightly shorter; scrobe cavity shallow, almost glabrous, lateral margins irregular; interantennal projection with a minute anterior carina; combined widths of compound eyes

five-sevenths interocular space at level of antennal bases; width of malar space one-third height of compound eye; diameter of posterior ocellus slightly more than one-third interocellar space.

Dorsum of thorax deeply and irregularly pitted, the pits tending to coalesce; anterolateral angles of pronotum carinate, anterior dorsal carina rather irregular, interrupted on mesal one-quarter; parapsidal furrows distinct; prepectus not quite reaching tegula; apical lamina of mesoscutellum not depressed on meson; metepisternum provided with large punctures except at posteroventral angle; metacoxa shagreened on outer dorsal surface, pitted and setose elsewhere; outer surface of metafemur shagreened and densely covered with rather long setae, outer ventral margin with 20 to 22 teeth, the basal one larger than others; sharp inner tooth present.

Propodeum coarsely carinate, areas between carinae minutely reticulated, lateral teeth lacking, spiracles vertical; petiole three times as long as wide, surface minutely shagreened, lateral carinae present, basal lamina much wider on ventral than on dorsal side; gaster longer than metafemur, tergites 3 and 4 glabrous, their combined lengths greater than following ones combined, tergites 5 to 8 minutely shagreened, lateral setae present on tergites 4 to 7; eighth tergite uniformly covered with long setae, spiracles oval; cerci large, oval, provided with fine long setae and located near posterior margin of epipygium; a patch of long, stiff setae ventrolaterad of each cercus.

Male: 2 mm. Antennal scape (fig. 9, *g*) broad and stout; width of malar space slightly more than one-third height of compound eye; combined widths of compound eyes equal to width of interocular space at level of antennal bases; diameter of posterior ocellus two-fifths interocellar space; petiole three times as long as wide.

Type locality.—Illinois.

Types.—Holotype, female, Dixon Springs, Ill., July 9, 1935, DeLong and Ross; allotype, male, Falls Church, Va., July 11, 1920, E. A. Chapin; paratypes, Oswego, N. Y., July 1, 1897, 1 male, Champaign, Ill., July 2, 1890, Hart and Marten, 1 female. Holotype and one paratype deposited in Illinois State Natural History Survey collection; allotype and one paratype in the U. S. National Museum.

Host.—Unknown.

SPILOCHALCIS LECTA (Cresson)

FIGURE 9, *f*

Smicra lecta CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 36, 44, 1872.—CAMERON, Biologia Centrali-Americana, Hymenoptera, vol. 1, p. 94, 1884.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 35, 1885.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 378, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 34, 1909.—CRESSON, The Cresson types of Hymenoptera, p. 75, 1916.

This species is most easily recognized by the head, from the dorsal aspect, being one-half as long as wide, with the scrobe cavity deep, the metacoxa with a completely glabrous outer dorsal surface, the abdominal petiole short, and the abdomen rather strongly compressed. *S. lecta* is quite similar in structure to the genotype, and apparently also to *S. indica* Mani, recently described from India.[16]

Description.—Black with large yellow spots; anterior and mesolegs, frons, two large anterolateral areas of dorsum of pronotum, broad anterolateral spots of mesopraescutum, tegulae, all of mesoscutellum except narrow apical band, metatrochanters and metafemora except variable spots on outer surface, yellow.

Female: Unknown.

Male: 4.5–5.5 mm. Antennal scape (fig. 9, *f*) with apex not quite reaching level of ventral margin of anterior ocellus, pedicel slightly longer than segment 4, ring segment one-half length of pedicel, segment 5 slightly shorter than 4, segments 5 to 10 equal, 11 and 12 slightly shorter than 10, 13 equal to 10; scrobe cavity deep, edge carinate at ventral and dorsal margins, dorsal carina located just ventral to anterior ocellus; interantennal projection with a minute dorsal carina; frons deeply but scatteringly punctured laterad of scrobe cavity, ventrad of antennal bases a few irregular transverse carinae present, area laterad of scrobe cavity slightly produced cephalad; frontal tentorial pits located just laterad of antennal bases, slightly above level of ventral margin of scrobe cavity; width of malar space one-third height of compound eye; frontogenal suture arced; genal area posterior to suture with rather indistinct oblique rows of large punctures; combined widths of compound eyes slightly less than interocular width at level of antennal bases; left mandible with two acute teeth, ventral one larger, right mandible with three teeth somewhat blunted at apex, ventral one largest; diameter of posterior ocellus slightly less than one-half interocellar space; head, when viewed from dorsal aspect, slightly greater than one-half as long as wide.

Dorsum of thorax densely and deeply pitted, areas between punctures minutely reticulated; pubescence mostly short, longer at posterior margins of pronotum and mesoscutellum; anterolateral angles of pronotum weakly carinate, anterior dorsal margin acarinate; parapsidal furrows obscure; prepectus narrow, tonguelike, reaching tegula; apex of mesoscutellum provided with a very narrow, mesally depressed lamina; metepisternum strongly and densely punctured, spaces between punctures glabrous, pubescence long and fine; metacoxae glabrous on outer dorsal surface, elsewhere minutely, scatteringly punctured and setose; metafemora globose, outer surface minutely reticu-

[16] Rec. Indian Mus., vol. 37, p. 252, 1935.

lated, densely covered by short setae, ventral margin with 18 to 25 small, closely set teeth, the basal one rounded (as in fig. 12, *k*); inner tooth distinct, blunt.

Propodeum covered with irregular, strong carinae, areas between carinae minutely reticulated, spiracular openings, almost vertical, no lateral propodeal projections present; petiole short, slightly less than twice as long as wide, glabrous on dorsal side, minutely reticulated on lateral and ventral sides, basal lamina narrow, interrupted at dorsolateral angles, distinct lateral carinae present, usually extending from base to apex but sometimes obliterated near apex; gaster compressed, slightly shorter than metafemur, abdominal tergites 4 to 7 with a few lateral setae, eighth tergite minutely shagreened, sparsely setose, spiracular openings oval; cerci large, oval, located near posterior margin of ninth tergite.

Type locality.—Mexico.

Types.—Holotype, male, 1805.1; paratype, 1805.2, 1 male: Academy of Natural Sciences of Philadelphia.

Host.—Unknown.

Distribution.—Texas: Brownsville, June, 1 male, November 22–December 8, 1910, 5 males.

Mexico: Sumichrast, 2 males (holotype and paratype).

SPILOCHALCIS PALLENS (Cresson)

Smiera palens Cresson, Proc. Ent. Soc. Philadelphia, vol. 4, p. 96, 1865.

Smiera pallens Cresson, The Cresson types of Hymenoptera, p. 76, 1916.

Smicra pallens (Cresson) Walker, Notes on Chalcidiae, p. 51, 1871.—Cresson, Trans. Amer. Ent. Soc., vol. 4, pp. 38, 54, 1872.—Howard, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 35, 1885.—Dalla Torre, Catalogus hymenopterorum, vol. 5, p. 380, 1898.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 35, 1909.

Spilochalcis pallens (Cresson) Vickery, Journ. Econ. Ent., vol. 8, p. 391, 1915; Proc. Ent. Soc. Washington, vol. 27, p. 139, 1925.—Luginbill, U. S. Dept. Agr. Techn. Bull. 34, p. 76, 1928.—Vickery, U. S. Dept. Agr. Techn. Bull. 138, pp. 21, 50, 1929.

This minute, vaguely colored species is closely related to *Spilochalcis xantha*, described below, in having the thorax broad, the anterior margin of the pronotum acarinate, the head nearly one-half as long as wide, and the vertex broadly rounded; it differs in that the dorsum of the thorax is very coarsely (rather than lightly) punctured, the compound eyes and posterior ocelli are almost contiguous, the abdomen is distinctly acuminate (rather than semiglobose), and the basal tooth of the metafemur is acute rather than rounded. *S. pallens* is also slightly smaller and more vaguely marked than *S. xantha*.

Type locality.—Cuba.

Types.—Holotype, female, 1793.1; allotype, male, 1793.3; paratypes, 1793.2, 1793.4, 2 females, Academy of Natural Sciences of Philadelphia.

The allotype is labeled "variety" and may eventually be shown to represent another species.

This species is known to me only from the types, but several references to it have appeared in the North American literature. I have not located the material on which these records were based. Vickery records several experiments performed with this species, and gives a partial life history. *S. pallens* is, like the other members of this genus, a pupal parasite; Vickery described the oviposition in pupae of *Apanteles marginiventris* (Cresson). The males are produced parthenogenetically.

Hosts.—*Meteorus laphygmae* Viereck, *Rogas laphygmae* Viereck, *Apanteles marginiventris* (Cresson) (Hymenoptera, Braconidae) [Vickery].

Distribution.—Cuba, 3 females, 1 male (types).

SPILOCHALCIS XANTHA, new species

This species agrees with *S. subobsoleta* (Cresson) in having the antennal scape short, the flagellum stout, the head, from the dorsal aspect, one-half as long as wide, and the basal tooth of the metafemur rounded instead of acute. It differs from that species in having the scrobe cavity shallow instead of deep, and the outer dorsal surface of the metacoxa glabrous instead of shagreened. Moreover, it is almost entirely yellow, while *S. subobsoleta* is mostly black.

Description.—Yellow with brown or black markings; usually antennal flagellum, occiput, variable short, transverse mark at anterior margin and longitudinal mesal stripe of mesopraescutum, anteromesal areas of lobes of mesoscutum, anterior margins and posterolateral angles of axillae, usually a narrow longitudinal mesal stripe on mesoscutellum, variable marks on mesopleuron, sometimes a vague, round mark on dorsolateral surface of metacoxae, metafemoral teeth, variable basal stains on propodeum, usually most of gaster, black or brown.

Female: 3.5–4 mm. Antennal scape short, apex not quite attaining level of ventral margin of anterior ocellus, pedicel equal in length to segment 6, ring segment with anterior margin oblique instead of transverse so that fourth antennal segment is narrower on mesal side than on outer side, segment 5 slightly shorter than 6, following segments somewhat variable but all subequal; scrobe cavity shallow, margin completely acarinate; interantennal projection produced slightly cephalad, provided with a faint carina near apex; frons lightly shagreened and covered by minute, slightly irregular carinae, these reticulations transverse ventrad of antennal bases, but laterad of scrobe cavity usually directed obliquely; frons with a few short, scattered setae; frontal tentorial pits located at level of antennal bases; width of malar space slightly less than one-quarter height of

compound eye; frontogenal suture straight; combined widths of compound eyes three-quarters width of interocular space at level of antennal bases; left mandible with two teeth, right with three; diameter of posterior ocellus slightly less than one-half width of interocellar space; head, from dorsal aspect, one-half as long as wide.

Dorsum of thorax shagreened and provided with scattered shallow punctures, pubescence sparse; anterolateral angles of pronotum weakly carinate, anterior dorsal margin acarinate; parapsidal furrows distinct; prepectus narrow, apex not quite reaching tegula; mesoscutellum with a narrow apical lamina, which is only slightly depressed on meson; metepisternum provided with deep punctures, areas between punctures glabrous; metacoxae glabrous, pubescent on outer ventral side; metafemora minutely reticulated on outer dorsal area, glabrous ventrad, sparsely setose, ventral margin with 16 to 20 small closely set teeth, basal one rounded (as in fig. 12, *k*); inner tooth acute.

Surface of propodeum provided with small, rather irregular carinae, areas between carinae minutely reticulated, spiracular openings vertical; petiole slightly less than twice as long as wide, glabrous on dorsal side, very lightly shagreened on ventral side, basal lamina wide on ventral and lateral sides, wanting on dorsal side, minute lateral carinae present; gaster usually equal to length of metafemur, very slightly compressed; abdominal segments 4 to 7 each with a single sparse row of lateral setae; eighth tergite lightly shagreened, almost glabrous, spiracular openings round; cerci large, oval, located slightly nearer posterior than anterior margin of epipygium and provided with three setae; apex of ovipositor sheath with a few short ventral setae.

Male: Unknown.

Type locality.—Arizona.

Types.—Holotype, female, Sabino Basin, Santa Catalina Mountains, Ariz., September 5, C. H. T. Townsend; paratypes, Highrolls, N. Mex., May 31, 1902, 1 female; Sabinal, Tex., April 1910, Pierce and Pratt, 1 female; Alice, Tex., February 27, 1909, F. C. Pratt, 1 female. Holotype and two paratypes deposited in the U. S. National Museum; one paratype in Academy of Natural Sciences, Philadelphia.

Host.—Unknown.

SPILOCHALCIS ODONTOTAE Howard

FIGURE 9, *h*

Spilochalcis odontotae HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 7, 1885; Ent. Amer., vol. 1, p. 117, 1885.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 385, 1898.—CHITTENDEN, Remedies for insect pests, p. 4, 1901.—COTTON, Ohio Nurs. and Orch. Insp. Bull. 7, p. 18, 1906.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 40, 1909.—SMITH, Ann. Rep. New Jersey State Mus. for 1909, p. 640, 1910.

Smicra odontotae (Howard) CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 234, 1887.

This small, dull-yellow species is most easily recognized by its short antennal scape and stout flagellum, with the ring segment one-half the length of segment 4, the shallow scrobe cavity, the head, from the dorsal aspect, being one-half as long as wide, and a strong carina on the genal area of the head, extending from the base of the mandible to the lateral ocellus.

Description.—Dull yellow with brown markings; all dorsal sutures of thorax, vague mesal stripe near apex of mesopraescutum, broad irregular longitudinal mesal stripe of mesoscutellum, variable areas on pleuron and venter, teeth of metafemur, lateral areas of propodeum, and transverse bands on abdominal tergites 5 to 8, brown; the head of one female specimen is bright red, but another specimen of the same sex has the head yellow.

Female: 3.5 mm. Apex of antennal scape not quite attaining level of ventral margin of anterior ocellus, pedicel one-fourth longer than and ring segment one-half length of segment 4, segments 4 to 10 equal in length and as wide as long, last three segments slightly shorter; scrobe cavity shallow, interantennal projection with a minute dorsal carina; frons laterad and dorsad of scrobe cavity coarsely punctate, area ventrad of antennal bases provided with a few irregular punctures, spaces between punctures minutely reticulated; frontal tentorial pits located near eye margins slightly dorsad of antennal bases; width of malar space one-third height of compound eye; frontogenal suture arced; on gena, a strong carina extends from midpoint of base of mandible around posterior margin of compound eye to posterior ocellus; combined width of compound eyes equal to width of interocular space at level of antennal bases; left mandible with two acute teeth, right with three; diameter of posterior ocellus two-fifths interocellar space.

Dorsum of thorax covered by shallow, irregular punctures, area at anterior margin of mesopraescutum without punctures, but minutely shagreened; pubescence long, dense, white; anterolateral angles of pronotum minutely carinate, anterior dorsal margin acarinate; parapsidal furrows distinct; prepectus narrow, fingerlike, not quite reaching tegula; mesoscutellum with a narrow apical lamina; metepisternum strongly punctured, pubescence long and dense; metacoxae minutely shagreened, shallowly pitted and setose on outer ventral side; metafemur rather slender, outer surface minutely reticulated, densely covered by short setae, ventral margin with 16 to 18 small, acute teeth, basal one slightly larger; inner tooth acute.

Propodeum provided with irregular, strong carinae, areas between carinae almost glabrous, one small lateral projection present at each

posterolateral angle, spiracular slits almost vertical; petiole slender, twice as long as wide, dorsal surface minutely reticulated, almost glabrous, basal lamina slightly wider on ventral than on dorsal side, lateral carinae present; gaster flattened on dorsal surface, slightly longer than metafemur, abdominal tergites 4 to 7 with long lateral setae; eighth tergite minutely reticulated, and provided with long, sparse setae, spiracular openings round; cerci oval, located near posterior margin of epipygium, usually provided with three long setae; apex of ovipositor sheath with a few long ventral setae.

Male: 3 mm. Antennal scape (fig. 9, *h*) short, stout; malar space slightly less than one-third height of compound eye; combined widths of compound eyes equal to width of interocular space at level of antennal bases; petiole two and one-half times as long as wide; gaster shorter than metafemur.

Type locality.—Washington, D. C.

Type.—Holotype, male, 2624, U. S. National Museum.

Host.—*Chalepus dorsalis* Thunberg [=*Odontota scutellaris* (Olivier)] (Coleoptera, Chrysomelidae).

Distribution.—District of Columbia: Washington, July 31, 1884, 3025^{03}, 1 male (holotype); August 12, 1884, 3025^{03}, 1 female, 1 male; all three specimens reared from *Chalepus dorsalis* mining leaves of *Robinia pseudoacacia.* North Carolina: Tin City, July 10, 1934, F. S. Blanton, 1 female.

SPILOCHALCIS SUBOBSOLETA (Cresson)

Figures 9, *i;* 12, *k*

Smicra subobsoleta Cresson, Trans. Amer. Ent. Soc., vol. 4, pp. 36, 42, 191, 1872.—Howard, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 36, 1885.—Cresson, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 234, 1887.—Dalla Torre, Catalogus hymenopterorum, vol. 5, p. 382, 1898.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 36, 1909.—Cresson, The Cresson types of Hymenoptera, p. 76, 1916.

Smicra bioculata Cresson, Trans. Amer. Ent. Soc., vol. 4, pp. 36, 43, 192, 1872.—Howard, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 33, 1885.—Ashmead, Trans. Amer. Ent. Soc., vol. 13, p. 125, 1886.—Cresson, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—Dalla Torre, Catalogus hymenopterorum, vol. 5, p. 374, 1898.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 34, 1909.—Cresson, The Cresson types of Hymenoptera, p. 74, 1916.

Spilochalcis bioculata (Cresson) Viereck, Trans. Amer. Ent. Soc., vol. 32, p. 184, 1906.

Smicra bioculata faceta Cresson, Trans. Amer. Ent. Soc., vol. 4, p. 43, 1872; Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—Dalla Torre, Catalogus hymenopterorum, vol. 5, p. 374, 1898.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 34, 1909.—Cresson, The Cresson types of Hymenoptera, p. 75, 1916.

This species is most easily recognized by its compact body, with the antennal scape short and flagellum stout, the head, from the dorsal aspect, one-half as long as wide, the metafemora semiglobose and with 18 or more minute ventral teeth, the basal one rounded, not acute (fig. 12, *k*), and the abdomen strongly compressed.

Description.—Black with yellow markings; anterior and mesolegs, frons, all dorsal area of pronotum except narrow mesal spot, broad, wedge-shaped lateral spots of mesopraescutum, tegulae, lobes of mesoscutum except variable longitudinal mesal mark, usually small ventral spot at apex of metacoxa, basal and variable dorsal and apical spots of metafemur, yellow; abdomen varying from black to rufous.

Female: 4–4.5 mm. Apex of antennal scape not quite reaching level of ventral margin of anterior ocellus, pedicel slightly longer than segment 4, ring segment one-half length of pedicel, segments 4 to 11 equal in length, 12 and 13 slightly shorter; scrobe cavity deep, edge indistinctly carinate at dorsal and ventral margins, several indistinct transverse carinae usually present in scrobe cavity just ventrad of anterior ocellus; interantennal projection with a minute dorsal carina; deep, closely set punctures on frons lateral to scrobe cavity, punctures scattered ventrad of antennal bases, tending to coalesce to form irregular transverse carinae; frontal tentorial pits located just laterad of scrobe cavity, at level of ventral margin; width of malar space one-third height of compound eye; frontogenal suture for one-half its length extending directly ventrad from compound eye, then abruptly curved toward mandible; area of gena posterior to frontogenal suture usually with three oblique rows of large punctures; combined widths of compound eyes slightly more than one-half interocular width at level of antennal bases; left mandible with two acute teeth, the ventral one larger, right mandible with three teeth, the middle one smallest and most blunt; diameter of posterior ocellus slightly less than one-half interocellar width.

Dorsum of thorax densely and coarsely pitted, areas between punctures minutely reticulated; pubescence short except at posterior dorsal margin of pronotum and on mesoscutellum; anterolateral angles of pronotum weakly carinate, dorsal anterior margin acarinate; parapsidal furrows obscure; prepectus narrow, tongue-shaped, slightly overlapping anterior apex of tegula; apex of mesoscutellum provided with a narrow, mesally depressed lamina; metepisternum deeply and closely punctured; metacoxae minutely shagreened on outer dorsal surface, strongly punctured and setose elsewhere; metafemora globose, outer surface minutely reticulated, ventral margin with 18 to 26 small, closely set teeth, basal one rounded, not acute (fig. 12, *k*); inner tooth large, usually acute; metatibia with apex acute or blunt.

Propodeum thickly covered by irregular, closely set carinae, areas between carinae minutely reticulated, lateral propodeal projections wanting, spiracular openings nearly vertical; petiole short, less than twice as long as wide, minutely shagreened on dorsal side near base, slightly more strongly shagreened on lateral and ventral sides, basal lamina narrow, strong lateral carinae present; gaster compressed, usually somewhat shorter than metafemur, abdominal tergites 4 to 7 with lateral setae; eighth tergite minutely shagreened, sparsely covered by long setae, spiracular openings round; cerci oval, located slightly nearer anterior than posterior margin of epipygium; apex of ovipositor sheath with a dense tuft of long ventral setae.

Male: 4.5–5.5 mm. Antennal scape (fig. 9, *i*) stout, sinuate; width of malar space one-fourth height of compound eye; combined widths of compound eyes two-thirds width of interocular space at level of antennal bases; inner tooth of metafemur blunt; petiole varying from slightly more than one-third to one-half as wide as long.

Type locality.—Texas.

Types.—Holotype, male, 1436, U. S. National Museum. The female was described as *Smicra bioculata* Cresson, from Texas; types: *bioculata* Cresson, 1784, Academy of Natural Sciences of Philadelphia, and 1652, U. S. National Museum; *bioculata faceta* Cresson, 1653, U. S. National Museum.

The types of *S. subobsoleta* Cresson and *S. bioculata* Cresson show distinct color differences, but intermediates between the two are readily found; they differ structurally in that *bioculata* has the apex of the metatibia rather blunt, while it is acute in *subobsoleta.* All variations between these two extremes were found in the material secured for study, and one specimen was found which had one tibia acute and the other blunt. The type of *S. bioculata faceta* has the yellow spots very light, but is otherwise identical with the typical form of this species.

Host.—Unknown.

Distribution.—Colorado, Florida, Illinois, Iowa, Kansas, Montana, North Dakota, South Dakota, Texas, Wyoming.

SPILOCHALCIS PALLIPES (Smith)

FIGURE 9, *j*

Chalcis flavipes ASHMEAD (not Panzer), Trans. Amer. Ent. Soc., vol. 12, p. xi, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 234, 1887.

Chalcis pallipes SMITH, Ent. Amer., vol. 2, p. 19, 1886.

Chalcis pallidipes DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 391, 1898.

Smicra flavipes (Ashmead) DALLA TORRE, *ibid.*, p. 377.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 35, 1909.

This species is known to me only from the type, a single male specimen collected in Jacksonville, Fla., by W. H. Ashmead, and another specimen collected in the same city by Mrs. A. T. Slosson. Both specimens are, unfortunately, in very poor condition, but they show a few slight characters that serve to distinguish them from *S. subobsoleta* (Cresson), which they closely resemble. Larger series of specimens will probably show that these differences are not of specific value, but, as no intergrades have as yet been found, it is better to consider these specimens as representatives of a distinct species.

Description.—Male: 3.5 mm. Identical in all respects with the male of *S. subobsoleta* (Cresson) except in the following particulars: Dorsum of thorax entirely black, without any color spots; antennal scape (fig. 9, *j*) short and stout; frontal tentorial pits located at level of ventral margin of scrobe cavity, midway between antennal bases and anterior margins of compound eyes; width of malar space slightly less than one-third height of compound eye; area of gena caudad of frontogenal suture provided with short, irregular carinae and minute reticulations; combined widths of compound eyes three-fourths width of interocular space at level of compound eyes; diameter of posterior ocellus slightly less than one-third width of interocellar space; apex of mesoscutellum provided with a narrow lamina which is only very slightly depressed on meson; apex of metatibia acute; no lateral projections present on propodeum; petiole one-half as long as wide, glabrous on dorsal side.

Female: Unknown.

Type locality.—Florida.

Type.—Holotype, male, 51946, U. S. National Museum.

Host.—Unknown.

Distribution.—Florida: Jacksonville, W. H. Ashmead, 1 male (holotype); Mrs. A. T. Slosson, 1 male.

The side Group

The *side* group of species comprises the most distinct section of the genus *Spilochalcis*. These species are all small or minute, predominantly black, and provided with small, irregular color spots. The lack of a frontogenal suture and the malar space being almost always one-half or more the height of the compound eye will most readily distinguish these species, but, in addition, they always have the clypeus nearly as long as wide, and possess an extremely shallow scrobe cavity. All have two teeth on the left mandible and three on the right, and the reticulations of the body are minute and irregular, with glabrous surfaces almost completely absent. An inner tooth is always present on the metafemora, and the outer ventral teeth are numerous and minute.

There is invariably a row of four or six small, round colored spots along the anterior dorsal margin of the pronotum, although these markings are rather indistinct in some specimens.

This group is clearly related to some species of the *femorata* group; several, such as *S. hirtifemora* (Ashmead) and *S. elachis*, new species, are excluded from this group and placed in the *femorata* group only by the possession of a frontogenal suture and a somewhat narrower malar space. More than half the material of Chalcidini I have obtained for study has been specimens referable to the *side* group. Some of the species in this group are parasites of insect pests, and numerous references to them have appeared in the economic literature. It has been possible to secure for study much of the material on which these references were based. As the types for these species have not, so far as I know, been studied before, it is not surprising that misidentifications should have occurred. Specific differences in this group are much more critical than in the other groups of the genus, and the "habitus" of all the species is quite similar.

The color pattern of all species in this group is fundamentally the same. Hence, a generalized color description is given here for all the species of the group. This applies, with slight discrepancies, to all the species.

Color description.—Black with small, variable greenish-white, red, or yellow spots: mandibles, variable spots on frons, two mesal and four lateral spots on dorsal side of pronotum, anterolateral angles of mesopraescutum, and scutum, large lateral spots on mesoscutellum, variable ventral, basal, and apical spots on outer surface of metafemur, usually a lateral row of two to six spots on each side of gaster, greenish white, red or yellow; abdominal segments 3 to 5 of female often dull red. Teneral specimens are rufous instead of black.

KEY TO SPECIES OF THE SIDE GROUP

1. Male, ninth abdominal sternite exposed, antennal scape broad 2
   Female, ninth abdominal sternite concealed, antennal scape narrow 8
2. Mesopraescutum with two rounded, impunctate anterior elevations ..... dema (p. 330)
   Mesopraescutum with surface uniformly covered with large punctures, surface not elevated 3
3. Antennal scape extremely stout, with a prominent, darkened anterior carina (fig. 9, *l*), apex exceeding level of vertex 4
   Antennal scape more slender, without a darkened anterior carina (fig. 9, *m–o*), apex not exceeding level of vertex 5
4. Antennae inserted dorsad of ventral margins of compound eyes, malar space less than two-thirds height of compound eye; basal lamina of petiole forming a 60° to 70° angle with dorsal surface of petiole (as in fig. 13, *j*) ..... sanguineiventris (p. 335)

Antennae inserted on a level with ventral margins of compound eyes, malar space more than three-quarters height of compound eye; basal lamina of petiole at a right angle to dorsal surface of petiole (as in fig. 13, *i*)---------- flavopicta (p. 331)

5. Entire area of frons laterad and ventrad of scrobe cavity yellow or whitish; diameter of lateral ocellus greater than width of area between lateral ocellus and inner margin of compound eye---------- leptis (p. 340)

Not having that combination of characters---------- 6

6. A small glabrous patch present in scrobe cavity just dorsad of each antennal base---------- 7

Scrobe cavity lacking glabrous areas---------- delumbis (p. 342)

7. Frons with a circumflex-shaped yellow mark just dorsad of mouth parts: a small dark brown or black area present just dorsad of clypeus---------- albifrons (p. 339)

Entire frons ventrad of antennal bases yellow; area just dorsad of clypeus yellow---------- side (p. 336)

8. Mesopraescutum with two round, impunctate anterior elevations---------- dema (p. 330)

Mesopraescutum with surface uniformly covered by large punctures, surface not elevated---------- 9

9. Maximum dorsal length of epipygium greater than length of eighth tergite (ratios varying from 14:9 to 12:9)--- flavopicta (p. 331)

Maximum dorsal length of epipygium equal to or less than length of eighth tergite---------- 10

10. Antennae inserted dorsad of ventral margins of compound eyes; width of interantennal space equal to or greater than width of space between antennal fossa and compound eye; frons possessing a pair of vertical foveae ventrad of antennal bases; clypeus one and one-half times as wide as long. sanguineiventris (p. 335)

Not having that combination of characters---------- 11

11. Diameter of posterior ocellus greater than width of space between ocellus and margin of compound eye; antennal flagellum dark on dorsal side and light ventrad---------- leptis (p. 340)

Diameter of posterior ocellus less than width of space between ocellus and margin of compound eye; antennal flagellum uniform in color---------- 12

12. Propodeum with two basolateral areas shagreened, these areas surrounded by strong, confused carinae; coxal flange at apex of metepisternum smooth---------- 13

Propodeum entirely rugose, not having basolateral shagreened areas; coxal flange at apex of metepisternum with two or three minute carinae parallel with margin---------- delumbis (p. 342)

13. Tergites at base of gaster rufous or red; each tergite of gaster usually with a pair of lateral yellow spots---------- side (p. 336)

All abdominal tergites black; usually only basal and apical tergites of gaster with lateral yellow spots---------- albifrons (p. 339)

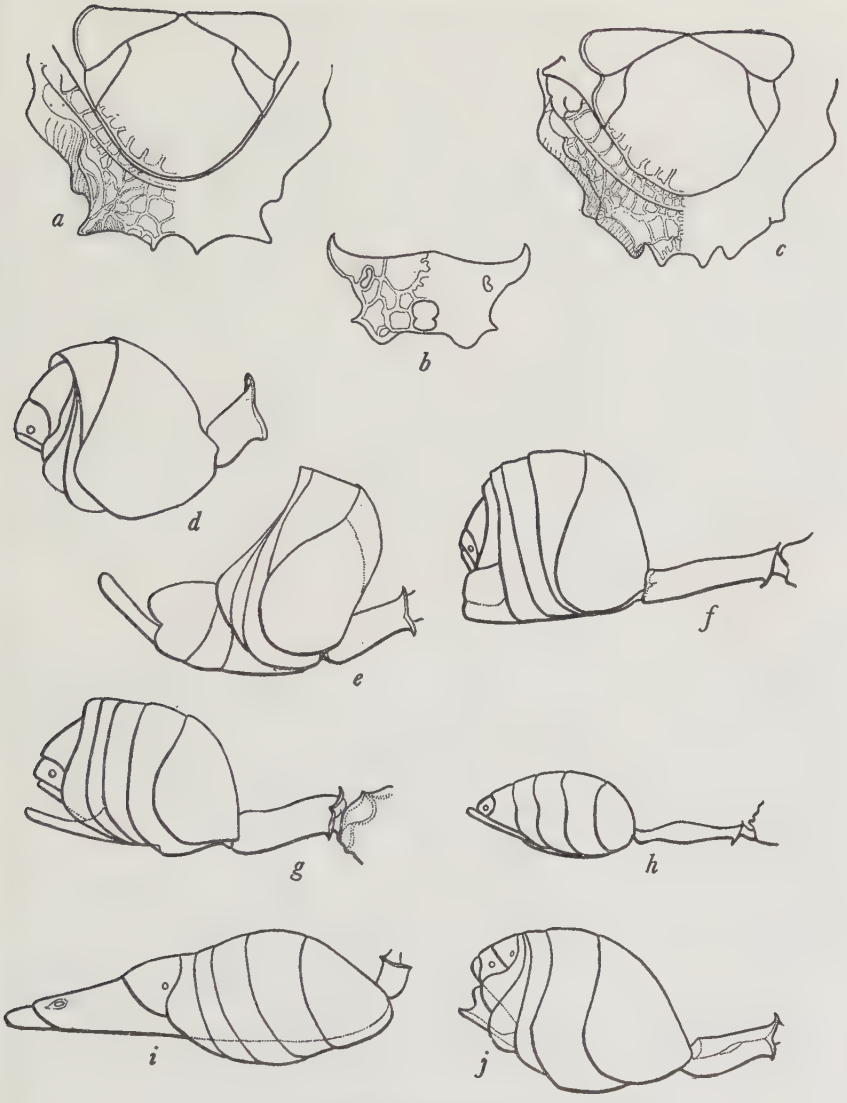

FIGURE 13.—Abdominal structures of Chalcidini.

a, *Spilochalcis nigricornis* (Fabricius): Propodeum, dorsal aspect.
b, *Spilochalcis delicata* (Cresson): Propodeum, posterior aspect.
c, *Spilochalcis nortoni* (Cresson): Propodeum, dorsal aspect.
d, *Spilochalcis xanthostigma* (Dalman): Petiole and gaster, lateral aspect.
e, *Chalcis myrifex* (Sulzer): Petiole and gaster, lateral aspect.
f, *Chalcis microgaster* Say: Petiole and gaster, lateral aspect.
g, *Chalcis barbara* (Cresson): Petiole and gaster, lateral aspect.
h, *Ceratosmicra meteori*, new name: Petiole and gaster, lateral aspect.
i, *Spilochalcis dema*, new species: Petiole and gaster, lateral aspect.
j, *Metadontia amoena* (Say): Petiole and gaster, lateral aspect.

SPILOCHALCIS DEMA, new species

FIGURES 9, *k*; 13, *i*; 14, *i*

Spilochalcis sp. MONTGOMERY, Can. Ent., vol. 65, p. 187, 1933.

This species is most closely related to *S. flavopicta* (Cresson), but the female differs in that the malar space is nearly as wide as the height of the compound eye, not one-half as wide, the thorax is wider and more compact with two round, impunctate elevations on the mesopraescutum, and the longitudinal dorsal length of the epipygium of the female is twice as great as the length of the eighth tergite (fig. 13, *i*). The males of the two species differ most conspicuously in that the male of *flavopicta* has the antennal scape extremely large (fig. 9, *l*), while it is quite narrow in this species (fig. 9, *k*).

Description.—Male: 3–5.5 mm. Antennae inserted at level of ventral margins of compound eyes, apex of scape slightly exceeding level of ventral margin of anterior ocellus, pedicel four-fifths and ring segment one-fifth length of segment 4, 5 equal to pedicel, segments 5 to 9 equal in length, 10 very slightly shorter, 11 one-sixth shorter than 9, 12 and 13 equal and shorter than 11, scrobe cavity shallow, edge indistinctly carinate at ventral margin; interantennal projection wide, without an apical lamina; frons shagreened over entire surface, sparsely covered by rather long setae; width of malar space three-fourths height of compound eye; combined widths of compound eyes two-thirds width of interocular space at level of apex of interantennal projection; left mandible with two equal, acute teeth, right mandible with three, the dorsal one slightly larger; diameter of posterior ocellus two-fifths width of interocellar space.

Dorsum of thorax minutely shagreened, provided with large pits except on two rounded anterolateral areas of mesopraescutum; posterolateral angles of pronotum produced in small, rounded projections; prepectus narrow, fingerlike, slightly overlapping anterior apex of tegula; apex of mesoscutellum provided with a very narrow, mesally depressed lamina; metepisternum deeply, scatteringly pitted, areas between pits minutely shagreened, pubescence short; metacoxae minutely shagreened over entire surface, punctured and setose except on outer dorsal surface; metafemora globose, outer surface minutely shagreened, thinly covered by short setae, outer ventral margin with 18 to 23 small, closely set teeth, basal one slightly larger; inner tooth large, blunt.

Dorsal surface of propodeum strongly carinate except on two basolateral areas, the latter covered by small confused reticulations, a small apical projection present on each side of point of insertion of petiole, spiracular slits slightly curved laterad; petiole short, only slightly longer than wide; minutely shagreened and with distinct lateral carinae, basal lamina narrow; gaster usually equal in length

to metafemur, abdominal tergites 4 to 7 with rows of lateral setae; eighth tergite minutely shagreened, sparsely covered by moderately long setae, spiracular openings round; cerci oval, located near posterior margin of ninth tergite.

Type locality.—Indiana.

Types.—Holotype, female, Bedford, Ind., August 31, 1931, ex *Gelechia nundinella;* allotype, male, Bedford, Ind., September 9, 1931, ex *Gelechia nundinella;* paratypes, Bedford, Ind., August 15–September 24, 1931, ex *Gelechia nundinella*, 7 females, 5 males; Lawrence County, Ind., June 23, 1933, ex *Gelechia nundinella*, Musgrave, 3 females; Alamogordo, N. Mex., May 9, 1902, 1 female; Atherton, Mo., May 15, 1922, C. F. Adams, 1 female. Holotype, seven female and five male paratypes deposited in the U. S. National Museum; three paratypes in the Illinois State Natural History Survey collection; one paratype, Academy of Natural Sciences of Philadelphia, and one paratype, University of Kansas, Lawrence, Kans.

Host.—*Gelechia nundinella* Zeller (Lepidoptera, Gelechiidae).

SPILOCHALCIS FLAVOPICTA (Cresson)

FIGURES 7, *e;* 9, *l;* 14, *j*

Smiera flavopicta CRESSON, Proc. Ent. Soc. Philadelphia, vol. 4, p. 99, 1865.—CRESSON, The Cresson types of Hymenoptera, p. 75, 1916.

Smicra flavopicta (Cresson) WALKER, Notes on Chalcidiae, p. 51, 1871.—CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 36, 41, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 34, 1885.—ASHMEAD, Trans. Amer. Ent. Soc., vol. 13, p. 125, 1886.—CRESSON, Synopsis of the families and genera of Hymenoptera of America north of Mexico, p. 233, 1887.—ASHMEAD, Trans. Amer. Ent. Soc., vol. 14, p. 183, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 337, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 35, 1909.

Spilochalcis sp. PIERCE, Journ. Econ. Ent., vol. 1, p. 382, 1908.—PIERCE ET AL., U. S. Dept. Agr. Bur. Ent. Bull. 100, pp. 41, 49, 1912.—HUNTER and PIERCE, U. S. Dept. Agr. Bur. Ent. Bull. 114, p. 141, 1912.—MITCHELL and PIERCE, Proc. Ent. Soc. Washington, vol. 13, p. 55, 1912.

Smicra delira CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 36, 41, 191, 1872.—ASHMEAD, *ibid.*, vol. 12, p. x, 1885.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 34, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 375, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 34, 1909.

Spilochalcis delira (Cresson) HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 7, 1885.—VIERECK, Trans. Amer. Ent. Soc., vol. 32, p. 184, 1906.—SMITH, Ann. Rep. New Jersey State Mus. for 1909, p. 649, 1910.—BOTTIMER, Journ. Agr. Res., vol. 33, p. 803, 1926.—CUSHMAN, *ibid.*, vol. 34, p. 620, 1927.

Smicra decempunctata ASHMEAD, Trans. Amer. Ent. Soc., vol. 9, p. xxix, 1881.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 34, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 375, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 34, 1909.

Smicra mendica CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 36, 41, 1872.—CAMERON, Biologia Centrali-Americana, Hymenoptera, vol. 1, p. 94, 1884.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 35, 1885.—ASHMEAD, Trans. Amer. Ent. Soc., vol. 14, p. 183, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 379, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 35, 1909.—CRESSON, The Cresson types of Hymenoptera, p. 75, 1916.

This species is most easily recognized, in the female, by the longitudinal dorsal length of the epipygium being one and one-half times the length of the eighth tergite; the male has an extremely stout antennal scape which is inserted on a level with the ventral margins of the compound eyes, and the apex exceeds the level of the posterior ocelli.

Description.—Male: 3.5 mm. Antennae inserted on a level with ventral margins of compound eyes (fig. 7, *e*), apex of scape exceeding level of vertex, pedicel four times as long as and ring segment one-half length of segment 4, segments 5 and 6 equal to or slightly longer than 4, 7 to 10 progressively longer, so that 10 is one-half longer than 4, last three slightly shorter; scrobe cavity shallow, margin entirely without carinae, or with a very indistinct ventral one, a glabrous area just laterodorsad of each antennal base; interantennal projection broad, usually with a minute dorsal carina; frons covered by minute reticulations over entire surface, reticulations forming vague, minute parallel carinae on area laterad of scrobe cavity; width of malar space three-fourths or more height of compound eye; combined widths of compound eyes one-fifth less than width of interocular space at level of apex of interantennal projection; left mandible with two blunt teeth, right mandible with three acute teeth; diameter of posterior ocellus slightly less than one-half width of interocellar space.

FIGURE 14.—Male terminalia of Chalcidini.

a, *Chalcis divisa* (Walker): Ninth sternite.
b, *o*, *Chalcis lasia*, new species: *b*, Ninth sternite; *o*, male genitalia (*Oe*, aedeagus; *Sag*, sagitta; *Sh*, ovipositor sheath).
c, *Chalcis neptis*, new species: Ninth sternite.
d, *Chalcis flebilis* (Cresson): Ninth sternite.
e, *Chalcis barbara* (Cresson): Ninth sternite.
f, *Chalcis canadensis* (Cresson): Ninth sternite.
g, *Chalcis microgaster* Say: Ninth sternite.
h, *Podagrion mantis* Ashmead: Terminal abdominal segments, lateral aspect. (*C*, cercus; *Oe*, aedeagus; *Sp*, spiracle.)
i, *Spilochalcis dema*, new species: Penis valve.
j, *Spilochalcis flavopicta* (Cresson): Penis valve.
k, *Spilochalcis sanguineiventris* (Cresson): Penis valve.
l, *Spilochalcis side* (Walker): Penis valve.
m, *Spilochalcis leptis*, new species: Penis valve.
n, *Spilochalcis delumbis* (Cresson): Penis valve.

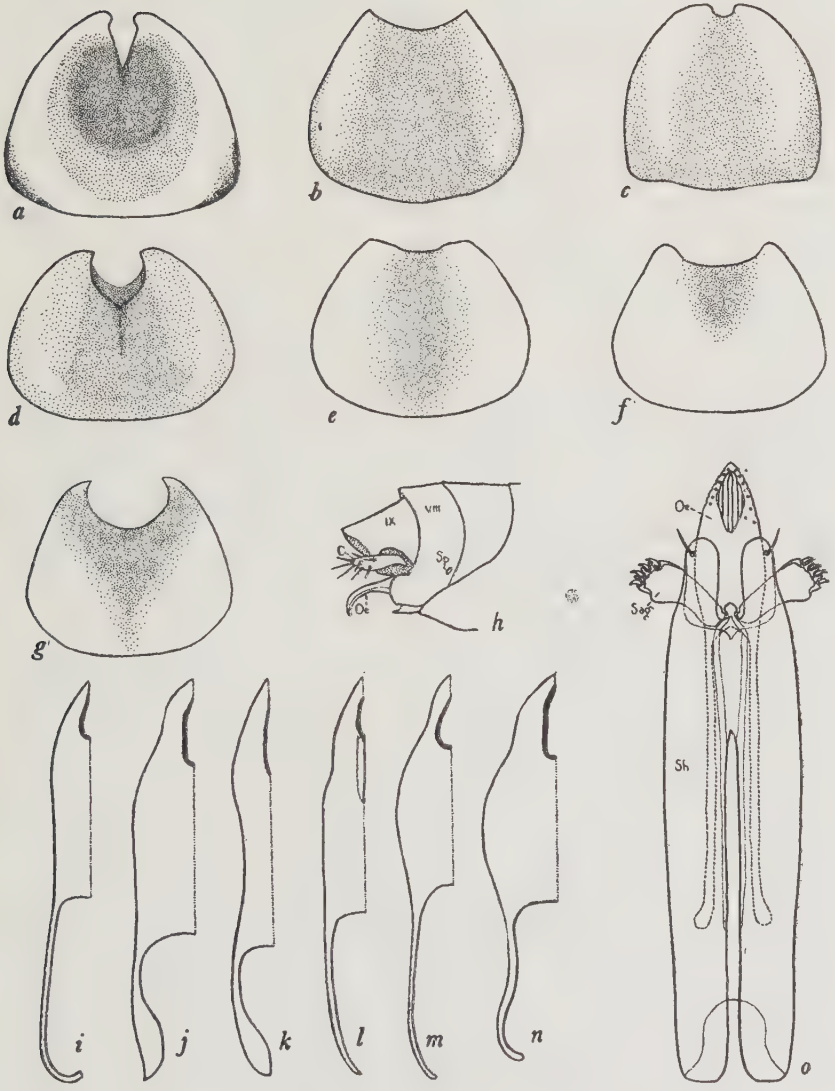

FIGURE 14.—See opposite page for explanation.

Dorsum of thorax closely and irregularly pitted, pubescence scattered, fine, slightly longer and thicker at posterior margins of mesopraescutum and axillae, and lateral and posterior margins of mesoscutellum; anterolateral and sublateral angles of pronotum produced, rounded, anterior dorsal margin acarinate; parapsidal furrows well defined; prepectus narrow, apex blunt, extending to tegula; apex of mesoscutellum with a mesally depressed, narrow lamina; metepisternum strongly and densely punctured, provided with only scattered fine setae; metacoxa shagreened on outer dorsal surface, lightly pitted and pubescent on ventral side; metafemur minutely reticulated, provided with short pubescence, ventral margin with 18 to 22 small, closely set teeth, the basal one slightly larger; inner tooth acute or slightly blunted.

Propodeum strongly carinate on meson and at apex, two large, minutely reticulated lateral areas at base, a pair of minute projections at lateroventral angles of propodeum, spiracular openings slanting slightly laterad; petiole twice as long as wide, entire surface shagreened, basal lamina narrow, from lateral aspect, appearing to be at right angles to dorsum of petiole, indistinct lateral carinae present; abdominal segments 4 to 7 each with a pair of dorsolateral patches of setae; eighth tergite minutely reticulated, provided with sparse, fine setae, spiracular openings oval; cercus located near apex of ninth tergite, usually provided with three long setae; penis valve (fig. 14, *j*).

Type locality.—Cuba.

Types.—Holotype, female, 1810, Academy of Natural Sciences of Philadelphia. The male was described as *Smicra delira* Cresson from Texas; type, 1655, U. S. National Museum. Synonyms: *decempunctata* Ashmead, 51945, U. S. National Museum; *mendica* Cresson, 1802, Academy of Natural Sciences of Philadelphia.

Reared materials have shown that *S. flavopicta* Cresson, described from Cuba, and *S. delira* Cresson, described from Texas, are the sexes of the same species. The type of *S. decempunctata* Ashmead, described from Florida, differs neither in color nor in structure from the type of *S. flavopicta* Cresson. The type of *S. mendica* Cresson, a male from Mexico, differs from the type of *S. delira* Cresson only in being slightly smaller, lighter in color, and having the darkened anterior carina of the antennal scape extending almost to the base, rather than only one-half the distance from the apex to the base; intergrades for all these characters are present in the available material.

Hosts.—*Ancylis comptana* Froehlich, *Evetria frustrana* Comstock (Lepidoptera, Eucosmidae); *Homoeosoma electellum* Hulst, *Acrobasis* sp. (Pyralidae); *Phalonia* sp. (Phaloniidae). A single male was found dead inside a cotton boll, along with the remains of a pupa

of *Anthonomus grandis* Boheman (Coleoptera, Curculionidae), and another single male was reared in Texas from an unidentified (probably dipterous) gall.

Distribution.—Alabama, Arizona, California, Delaware, Florida, Georgia, Maryland, Mississippi, New Mexico, North Carolina, Oregon, South Carolina, Texas, Virginia.

Cuba, Mexico.

SPILOCHALCIS SANGUINEIVENTRIS (Cresson)

FIGURE 14, *k*

Smicra sanguineiventris CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 36, 43, 191, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 35, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 234, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 381, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 36, 1909.

Spilochalcis sp. CHITTENDEN and RUSSELL, U. S. Dept. Agr. Bur. Ent. Bull. 66, p. 63, 1909.

The male of this species resembles that of *S. flavopicta* (Cresson) in having the antennal scape extremely large (as in fig. 9, *l*) with the apex exceeding the level of the vertex, but differs in that the malar space is less than two-thirds the height of the compound eye, the petiole has the basal flange, from the lateral aspect, appearing to be at an angle of 60° to 70°, not at 90°; in both *flavopicta* and this species, the proximal, nonfused part of the penis valve is short and stout, but it is somewhat more rounded in this species (fig. 14, *k*), and the distal portion is slenderer in this species than in *flavopicta*. The female of *sanguineiventris* is the only one of the *side* group having the antennae inserted dorsad of the ventral margins of the compound eyes, and the epipygium, which is equal to or shorter than the eighth tergite, will separate it from the female of *flavopicta*.

Description.—Male: 2.5–4 mm. Antennal scape stout, exceeding level of posterior ocelli, pedicel twice as long, and ring segment one-third as long as segment 4, segments 4 to 10 equal, last three shorter, sutures obscured by long, moderately dense setae; scrobe cavity shallow, margin acarinate, a glabrous patch present just dorsolaterad of each antennal base; width of malar space varying from three-fifths to almost two-thirds height of compound eye; combined widths of compound eyes three-fourths interocular space at level of apex of interantennal projection; diameter of posterior ocellus one-third interocellar space; width of head, from dorsal aspect, usually equal to maximum dorsal width of thorax.

Prepectus completely concealed by projecting angle of mesoscutum; apex of mesoscutellum with a minute, mesally depressed lamina; metepisternum irregularly pitted, ventral pits larger than dorsal ones;

metacoxae uniformly shagreened, outer surface with shallow pits and short pubescence; outer surface of metafemora lightly shagreened and sparsely covered with short pubescence, ventral margin with 17 to 20 teeth, basal one slightly larger; small, blunt inner tooth present.

Propodeum shagreened, strongly carinate only laterad, a minute tooth present at each posterolateral angle, spiracles curved laterad; petiole two to two and one-half times as long as wide, surface shagreened, lateral carinae vague or wanting entirely; gaster slightly longer than metafemur; eighth tergite sparsely setose; spiracles oval, almost round; cerci circular or slightly oval, placed near apex of ninth tergite; penis valve short and narrow (fig. 14, *k*).

Type locality.—Texas.

Type.—1658, U. S. National Museum, female.

Hosts.—(?) *Prodenia eridania* Cramer (Lepidoptera, Noctuidae); *Exema conspersa* (Mannerheim) (Coleoptera, Chrysomelidae).

Distribution.—Florida, Georgia, Texas, Virginia.

SPILOCHALCIS SIDE (Walker)

FIGURES 9, *m*; 14, *l*

Smiera side WALKER, Ann. Soc. Ent. France, ser. 1, vol. 2, p. 145, 1843.—CRESSON, Proc. Ent. Soc. Philadelphia, vol. 1, p. 228, 1862.

Smicra side (Walker) WALKER, Notes on Chalcidiae, p. 51, 1871.—CRESSON, Trans. Amer. Ent. Soc., vol. 4, p. 55, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 36, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 234, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 381, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 36, 1909.

Smicra torvina CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 36, 40, 191, 1872.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 36, 1885.—ASHMEAD, Trans. Amer. Ent. Soc., vol. 13, p. 125, 1886.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 234, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 383, 1898.—SMITH, Ann. Rep. New Jersey State Board Agr., vol. 27, suppl., p. 554, 1900.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 36, 1909.—CRESSON, The Cresson types of Hymenoptera, p. 76, 1916.—CHITTENDEN, U. S. Dept. Agr. Dept. Bull. 914, p. 1, 1920.—HOUGH, Virginia Agr. Exp. Stat. Bull. 259, p. 18, 1927.

Spilochalcis torvina (Cresson) TITUS, U. S. Dept. Agr. Bur. Ent. Bull. 54, p. 39, 1905.—VIERECK, Trans. Amer. Ent. Soc., vol. 32, pp. 184, 221, 227, 1906.—SNOW, Trans. Kansas Acad. Sci., vol. 20, p. 129, 1907.—SMITH, Ann. Rep. New Jersey State Mus. for 1909, p. 649, 1910.—VIERECK, Connecticut Geol. and Nat. Hist. Surv. Bull. 22, p. 527, 1916.—CHITTENDEN, U. S. Dept. Agr. Dept. Bull. 914, p. 11, 1920.—GIRAULT, Proc. U. S. Nat. Mus., vol. 58, p. 192, 1920.—VICKERY, Proc. Ent. Soc. Washington, vol. 27, p. 139, 1925.—PETCH and ARMSTRONG, Ann. Rep. Quebec Soc. Prot. Plants, No. 18, p. 104, 1926.—MUESEBECK and DOHANIAN, U. S. Dept. Agr. Dept. Bull. 1478, p. 19, 1927.—LUGINBILL, U. S. Dept. Agr. Techn. Bull. 34, p. 77, 1928.—VICKERY, U. S. Dept. Agr. Techn. Bull. 138, p. 21, 1929.—GILLESPIE, Maine For. Serv. Bull. 7, p. 15, 1932.—KEIFER and JONES, California Dept. Agr. Monthly Bull. 22, p. 388, 1933.—DONER, Ann. Ent. Soc. Amer., vol. 29, p. 234, 1936.

Smicra tourina SMITH, Geol. Surv. New Jersey, Catalogue of insects, p. 38, 1890.
Smicra delira CHITTENDEN, U. S. Dept. Agr. Dept. Bull. 914, p. 11, 1920.—HOUGH, Virginia Agr. Exp. Stat. Bull. 259, p. 18, 1927. (Misidentifications.)
Spilochalcis delira VICKERY, Journ. Econ. Ent., vol. 8, p. 391, 1915.—MARCH, Journ. Agr. Res., vol. 10, p. 1, 1917.—OTAVES and SISON, Philippine Agr. Rev., vol. 20, p. 251, 1927.—VICKERY, U. S. Dept. Agr. Techn. Bull. 138, p. 32, 1929.—NETTLES, Journ. Econ. Ent., vol. 27, p. 816, 1934. (Misidentifications.)
Spilochalcis sp. UNDERHILL, Virginia State Crop Pest Comm. Quart. Bull. 6, p. 6, 1924.—CUSHMAN, Journ. Agr. Res., vol. 34, pp. 619, 622, 1927.—FINK, *ibid.*, vol. 44, p. 555, 1932.

This common species is most easily recognized in the male by the broadly rounded vertex, the antennae inserted slightly dorsad of the ventral margins of the compound eyes, with the apex of the scape not exceeding the level of the posterior ocelli, the elongate pedicel (fig. 9, *m*) and the entire frons ventrad of the antennal bases being yellow. The female is recognized by its broadly rounded vertex, the basolateral areas of the propodeum being shagreened rather than carinate, and the basal tergites of the gaster rufous or red.

Description.—Male: 3–4 mm. Antennae inserted slightly dorsad of ventral margins of compound eyes, scape (fig. 9, *m*) not exceeding level of posterior ocelli, pedicel always at least one and one-half times as long as segment 4, often nearly twice as long, ring segment one-half length of segment 4, flagellar segments variable, 4 to 7 usually equal, 8 to 12 slightly longer, 13 equal to 7; scrobe cavity shallow, margin acarinate, a glabrous spot present in scrobe cavity just dorsad of each antennal base; frons minutely shagreened, provided with conspicuous white pubescence; interantennal projection minutely carinate; malar space one-half height of compound eye; left mandible with two acute teeth, right with three; combined widths of compound eyes equal to or slightly greater than interocular width at level of antennal bases; diameter of posterior ocellus slightly more than one-third width of interocellar space.

Dorsum of thorax shallowly and irregularly pitted, areas around parapsidal furrows impunctate; pubescence stout, white; anterolateral angles of pronotum slightly produced; anterior dorsal margin acarinate; prepectus narrow, reaching tegula; apex of mesoscutellum provided with a narrow, mesally depressed lamina; metepisternum shagreened, surface provided with large shallow punctures; metacoxae shagreened on outer dorsal side, obscurely punctured and setose on outer ventral surface; metafemora minutely reticulated, sparsely covered with short setae; outer ventral margin with 14 to 18 minute teeth, basal one larger and slightly blunted; small inner tooth present.

Propodeum usually entirely without setae, a few sometimes present at sides, surface shagreened, mesal and apical carinae present, a minute lateral projection at each posterolateral angle, spiracular

openings oblique; petiole shagreened, three to three and one-half times as long as wide, basal lamina narrow, lateral carinae usually wanting, sometimes vaguely indicated near base; gaster slightly longer than metafemur; abdominal segments 4 to 7 with a few sparse lateral setae; eighth tergite obscurely shagreened, provided with a few slender setae; spiracles oval; cerci obovate, located near posterior margin of ninth tergite; penis valve (fig. 14, *l*).

Type locality.—Florida.

Type.—Holotype, female, British Museum; comparisons made by Dr. Ch. Ferrière. Types for the synonym: *torvina* Cresson, 1671, U. S. National Museum, and 1780, Academy of Natural Sciences of Philadelphia.

As can be seen from the host list given below, this species has been reared from a number of diverse Lepidoptera, Coleoptera, and parasitic Hymenoptera. It has been reared as a primary and secondary parasite. It would seem doubtful that the forms reared from all these hosts should belong to the same species, although they are morphologically identical or the slight differences discernible between some specimens can be shown to intergrade. It has not been possible as yet to rear this parasite through more than one generation, but it may be that more successful biological studies will show that the same forms will oviposit in all these diverse hosts. If such is the case, the selection of a host by this species is governed solely by the availability of that host. All the host species for *S. side* occur in about the same environment.

Doner [17] has given a brief life history of this species, under the name *Spilochalcis torvina* (Cresson). He reared it as a rare primary pupal parasite of *Coleophora pruniella.*

Hosts.—Laphygma frugiperda Abbot and Smith (Lepidoptera, Noctuidae); *Paralechia pinifoliella* Chambers, *Recurvaria piceaella* Kearfott (Gelechiidae); *Ancylis comptana* Froehlich, *Ancylis divisana* Walker (Eucosmidae); *Choreutis silphiella* Busck (Glyphipterygidae); *Plutella maculipennis* Curtis (Plutellidae); *Argyresthia thuiella* Packard (Yponomeutidae); *Coleophora laricella* (Hübner), *Coleophora malivorella* Riley, *Coleophora fletcherella* Fernald, *Coleophora salmani* Heinrich, *Coleophora pruniella* Clemens (Coleophoridae); *Bucculatrix thurberiella* Busck (Lyonetidae).

Orchestes pallicornis Say, *Hypera rumicis* (Linnaeus), *Phytonomus nigrirostris* Fabricius (Coleoptera, Curculionidae).

Angitia plutellae Viereck, *Angitia hellulae* Viereck (Hymenoptera, Ichneumonidae); *Meteorus versicolor* (Wesmael), *Apanteles militaris* (Walsh) (Braconidae).

[17] Ann. Ent. Soc. Amer., vol. 29, p. 234, 1936.

Distribution.—Arizona, British Columbia, California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Idaho, Illinois, Iowa, Kansas, Maine, Maryland, Massachusetts, Minnesota, Montana, New Hampshire, New Jersey, New Mexico, New York, Ohio, Oklahoma, Ontario, Oregon, Quebec, Saskatchewan, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, Wisconsin.

SPILOCHALCIS ALBIFRONS (Walsh)

Chalcis albifrons WALSH, Trans. Illinois State Agr. Soc., vol. 4, p. 369, 1861.—CRESSON, Proc. Ent. Soc. Philadelphia, vol. 1, p. 229, 1862.—WALSH, Trans. Illinois State Agr. Soc., vol. 5, p. 483, 1865.—RILEY, 2d annual report on the noxious, beneficial and other insects of the State of Missouri, p. 52, 1870.—WALKER, Notes on Chalcidiae, p. 46, 1871.—RILEY, 8th annual report on the noxious, beneficial and other insects of the State of Missouri, p. 54, 1876.—THOMAS, 10th report of the State entomologist of Illinois, p. 40, 1881.—PACKARD, Guide to the study of insects . . ., p. 203, 1889.

Smicra albifrons (Walsh) CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 35, 39, 1872; Synopsis of the families and genera of Hymenoptera of America north of Mexico, p. 233, 1887.

Spilochalcis albifrons (Walsh) HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 7, 1885; U. S. Dept. Agr. Bur. Ent. Techn. Ser. Bull. 5, p. 34, 1897.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 38, 1909.—SMITH, Ann. Rep. New Jersey State Mus. for 1909, p. 649, 1910.—GIRAULT, Proc. U. S. Nat. Mus., vol. 58, p. 192, 1920.—DUNNMAN, Journ. Agr. Res., vol. 34, p. 154, 1927.—LEONARD, Cornell Univ. Agr. Exp. Stat. Mem. 101, p. 976, 1928.—WILSON, Florida Ent., vol. 16, p. 39, 1932; vol. 17, p. 3, 1933; Florida Agr. Exp. Stat. Techn. Bull. 271, p. 16, 1935.

Spilochalcis torvina ancylae GIRAULT, Proc. U. S. Nat. Mus., vol. 58, p. 192, 1920.

The male of this species, while almost identical with that of *Spilochalcis side* (Walker), is recognized most easily by the angular yellow mark located just dorsad of the clypeus. The female is considerably darker and averages larger than the female of *side*. In some cases it is impossible to distinguish the females of these two species.

Description.—Male: 2.5–3.5 mm. Identical with the male of *S. side*, redescribed on p. 337, except in the following particulars: Apex of scape reaching, but not exceeding, level of vertex; pedicel one and one-half to one and one-quarter times as long as segment 4, ring segment one-third as long as segment 4; diameter of posterior ocellus one-half as great as width of interocellar space. Prepectus often entirely concealed, when visible, extremely narrow and not quite touching tegula; outer ventral margin of metafemur with 11 to 16 minute teeth. Petiole shagreened, three to four times as long as wide, lateral carinae almost always well developed, a sparse row of long setae usually present along each dorsolateral angle of petiole; gaster usually equal in length to metafemur, occasionally slightly shorter; penis valve similar in form to that of *S. side* (fig. 14, *l*), but proportionately longer and slenderer.

Type locality.—Illinois.

Type.—Walsh's type of this species is lost, but a single male specimen in the U. S. National Museum is labeled "Type of *Chalcis albifrons* Walsh" and bears the catalog number 1530. As this specimen was collected 8 years after the description was published, it cannot be Walsh's type. Cresson redescribed this species in 1872, but the specimens he had then very likely have been lost subsequently. The two specimens now in the collection of the Academy of Natural Sciences of Philadelphia labeled "*Smicra albifrons*" do not agree with his redescription of the species. One is a female with the frons almost entirely black; the other is a specimen of *Spilochalcis melana*, new species, described on p. 316 above. The type in the National Museum may as well, therefore, be considered as the neotype for this species.

Hosts.—*Arogalea cristifasciella* Chambers (Lepidoptera, Gelechiidae); *Ancylis comptana* Froehlich, *Ancylis divisana* Walker, *Polychrosis viteana* Clemens (Eucosmidae); *Plutella maculipennis* Curtis (Plutellidae); *Coleophora fletcherella* Fernald, *Coleophora laricella* (Hübner), *Coleophora pruniella* Clemens, *Coleophora salmani* Heinrich (Coleophoridae).

Bathyplectes exigua (Gravenhorst) (Hymenoptera, Ichneumonidae); *Apanteles atalantae* (Packard), *Apanteles congregatus* (Say), *Apanteles griffini* Viereck, *Apanteles lacteicolor* Viereck, *Apanteles militaris* Walsh (Braconidae).

This species has been reared, undoubtedly from some ichneumonoid primary parasites of the following moths: *Plathypena scabra* (Fabricius) and *Thyridopteryx ephemeraeformis* Haworth.

Distribution.—British Columbia, California, Colorado, Delaware, District of Columbia, Florida, Idaho, Illinois, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Montana, New Hampshire, New Jersey, New York, Ohio, Ontario, Oregon, Pennsylvania, South Dakota, Texas, Virginia, Washington, West Virginia, Wisconsin, Wyoming.

SPILOCHALCIS LEPTIS, new species

FIGURES 9, *n*; 14, *m*

This species is closely related to *Spilochalcis side* (Walker) but differs in the male in having a shorter pedicel (fig. 9, *n*) and the lateral ocelli located very near to the inner margins of the compound eyes, not separated by a distance greater than the diameter of the ocellus, as in *side*; the male has the entire frons ventrad and laterad of the scrobe cavity yellow or whitish; the female is difficult to separate from the *side* female, but the large lateral ocelli located close to the compound eyes, and the scrobe cavity extending to the anterior

ocellus, not ended ventrad of it, can usually be relied upon to distinguish the female of this species.

Description.—Male: 2.5–3.5 mm. Antennae inserted dorsad of ventral margins of compound eyes, apex of scape not quite reaching level of posterior margin of anterior ocellus, pedicel equal to or slightly longer than segment 4, ring segment one-third to one-fourth length of pedicel, segments 4 to 8 equal, 9 and 10 slightly shorter, last three combined equal in length to 7 and 8; scrobe cavity shallow; frontal tentorial pits usually visible just laterad of antennal bases; width of malar space two-fifths height of compound eyes; combined widths of compound eyes slightly greater than interocular space at level of apex of interantennal projection; posterior ocelli separated from compound eyes by a distance less than diameter of ocellus; dorsal width of head slightly less than maximum dorsal width of thorax.

Prepectus minute, reaching tegula; apex of mesoscutellum with a minute, mesally depressed lamina; metepisternum with deep, scattered punctures, dorsal ones slightly smaller than ventral ones; metacoxae minutely shagreened, outer surface also shallowly and irregularly pitted; metafemur lightly shagreened, outer surface rather densely covered with short pubescence, ventral margin with 14 to 17 teeth, basal one only slightly larger than others; obscure inner tooth present.

Propodeum irregularly carinate, two shagreened or minutely reticulated basolateral areas present, a minute tooth present at each posterolateral angle, spiracles slanting slightly laterad; petiole two and one-half to three times as long as wide, basal lamina minute, lateral carinae present, but rather vague; gaster equal to or slightly longer than metafemur; eighth tergite very lightly shagreened, almost glabrous, sparsely setose, spiracles round; cerci oval, located near posterior margin of ninth tergite; penis valve (fig. 14, *m*).

Type locality.—California.

Type.—Holotype, male, Lassen National Forest, Calif., July 25, 1934, R. L. Furniss; allotype, female, same data as for holotype; paratypes, Lassen National Forest, Calif., July 25, 1934, ex *Zelleria haimbachi*, R. L. Furniss, 1 female, Colorado, 5 females, 3 males, Yerington, Nev., July 27, 1909, 3 males, Hollister, Idaho, June 10–24, 1930, D. E. Fox, 2 males, May 16–June 26, 1931, D. E. Fox, 3 females, 1 male, Tuttle, Idaho, July 14, 1931, D. E. Fox, 1 male, Kimama, Idaho, June 22, 1931, D. E. Fox, 1 male. Holotype, allotype, and 10 paratypes deposited in the U. S. National Museum; two paratypes, Cornell University; six paratypes, Colorado Agricultural College; two paratypes, Illinois State Natural History Survey.

Hosts.—*Zelleria haimbachi* Busck (Lepidoptera, Yponomeutidae); *Ancylis comptana* Froehlich, *Tmetocera ocellana* Schiffermuller (Eucosmidae); *Cacoecia argyrospila* (Walker) (Tortricidae).

Distribution.—In addition to the localities in the type series, material has been secured from Arizona, Iowa, Kansas, Missouri, Montana, Utah, Texas.

SPILOCHALCIS DELUMBIS (Cresson)

FIGURES 9, *o*; 14, *n*

Smicra delumbis CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 36, 40, 1872.—ASHMEAD, *ibid.*, vol. 12, p. x, 1885.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 34, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 375, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 34, 1909.

Spilochalcis delumbis (Cresson) VIERECK, Trans. Amer. Ent. Soc., vol. 32, p. 184, 1906.—CHAMBERLIN, Proc. Ent. Soc. Washington, vol. 35, p. 101, 1933.

Spilochalcis delumbis is separable from *S. side* only by critical characters. Each of these species is, furthermore, quite variable, but as the variation from one to the other is not quite continuous, they had best be retained as different species. As I have seen over a thousand specimens of these two species from a great many localities, the discontinuity between them probably will not disappear when more material is secured. The males are usually readily separable, but the females are to be distinguished only with difficulty.

The male of this species always has the antennae inserted on a level with the ventral margins of the compound eyes; the pedicel is small and cup-shaped and considerably narrower than the flagellum. The vertex is subacute rather than broadly rounded. Only an occasional male specimen has an angular color band dorsad of the clypeus; the interocular space is wide and the compound eyes are narrow. In the female, the vertex is subacute, the interocular space is wide and the eyes narrow, and the mesal projection of the eighth sternite is acute; this last character is often difficult to see, as the tergites of the anterior abdominal segments usually project ventrad so as to conceal the eighth sternite.

Description.—Male: 4–5 mm. Antennae inserted on a level with ventral margins of compound eyes, scape (fig. 9, *o*) with apex reaching level of dorsal margin of anterior ocellus, pedicel narrower than flagellum, three-quarters length of segment 4, ring segment one-quarter length of 4, 5 slightly longer than 4, segments 5 to 12 variable, usually equal in length, 12 often appearing subdivided, 13 minute; scrobe cavity shallow, margin usually completely acarinate, sometimes with obscure lateral carinae, glabrous areas lacking; frons irregularly and very minutely reticulated and shagreened, setae short, rather dense over most of surface; width of malar space one-half height of compound eye; combined widths of compound eyes one-fifth less than interocular space; left mandible with two teeth, ventral

one larger, right mandible with three teeth; diameter of posterior ocellus slightly less than one-half interocellar space.

Dorsum of thorax shallowly and irregularly punctured, setae inconspicuous except at ventral margin of mesopraescutum, on lobes of mesoscutum, axillae, and lateral margins of mesoscutellum; anterolateral and sublateral angles of pronotum produced and rounded, anterior dorsal margin acarinate; prepectus blunt at apex, reaching tegula; mesoscutellum with a very narrow, mesally depressed apical lamina; metacoxae strongly shagreened on outer dorsal surface, slightly less strongly reticulated and setose elsewhere; metafemora stout, minutely reticulated on outer surface, ventral margin with 17 to 26 minute teeth, the basal one only slightly larger than following ones; inner tooth blunt.

Propodeum with a very few lateral setae, surface completely covered by small carinae, basolateral areas usually with somewhat irregular, oblique carinae, lateral teeth wanting, spiracular openings slanting laterad; petiole shagreened, stout, less than twice as long as wide, basal lamina narrow on dorsal side, distinct lateral carinae present; gaster usually equal in length to metafemora, abdominal segments 3 to 6 almost glabrous on dorsal side, segment 7 faintly reticulated; eighth tergite shagreened, setae short and sparse, spiracular openings oval; ninth tergite provided with long setae, cerci oval, located nearer posterior than anterior margin; penis valve (fig. 14, *n*).

Type locality.—Massachusetts.

Types.—Holotype, male, 1781.1; allotype, female, 1781.2: Academy of Natural Sciences of Philadelphia.

Hosts.—*Lema trilineata* (Olivier), *Lema nigrovittata* (Guérin), *Chlamys plicata* (Fabricius) (Coleoptera, Chrysomelidae).

Distribution.—Arizona, Arkansas, California, Colorado, District of Columbia, Florida, Illinois, Iowa, Kansas, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New York, Ohio, Texas, Virginia.

Genus CERATOSMICRA Ashmead

Ceratosmicra Ashmead, Mem. Carnegie Mus., vol. 1, p. 251, 1904.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 30, 1909.—Gahan and Fagan, U. S. Nat. Mus. Bull. 124, p. 29, 1923. (Genotype, *Ceratosmicra lissa*, new name for *Ceratosmicra petiolata* Ashmead, not Cresson.)

Sayiella Ashmead (not Dall), Mem. Carnegie Mus. vol. 1, p. 251, 1904.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 30, 1909.

Eusayia Ashmead (new name for *Sayiella*), Proc. Ent. Soc. Washington, vol. 6, p. 126, 1904.—Gahan and Fagan, U. S. Nat. Mus. Bull. 124, p. 63, 1923.

Melanosmicra Ashmead, Mem. Carnegie Mus., vol. 1, p. 251, 1904.—Schmiedeknecht, Genera insectorum, fasc. 97, p. 31, 1909.—Gahan and Fagan, U. S. Nat. Mus. Bull. 124, p. 84, 1923.

Mischosmicra ASHMEAD, Mem. Carnegie Mus., vol. 1, p. 251, 1904.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 31, 1909.—GAHAN and FAGAN, U. S. Nat. Mus. Bull. 124, p. 90, 1923.

Description.—Antennal scape long, either attaining level of posterior ocelli or markedly exceeding it; left mandible with either two or three teeth, right mandible always with three teeth; body shallowly and irregularly pitted, dorsum of thorax often partly glabrous; pubescence conspicuously long, white; metafemora relatively slender (fig. 12, *l–o*), outer ventral margin with numerous, minute teeth, basal one always slightly longer than following ones; petiole long, slender, varying from 8 times as long as wide to 15 times as long as wide, length of petiole always three-fourths or more length of metacoxa, often as long as metacoxa; petiole occasionally enlarged just caudad of the middle (fig. 13, *h*); basal lamina of petiole usually wide, always directed caudad on ventral side.

The species of *Ceratosmicra* are, where known, hyperparasites; they usually emerge from the cocoons of *Apanteles* or *Meteorus*.

KEY TO SPECIES OF CERATOSMICRA

1. A strong tooth projecting from venter of propodeum between bases of metacoxae; petiole 14 or more times as long as wide at its widest point ..... **debilis** (p. 344)
   Propodeum without a ventral tooth; petiole shorter 2
2. Petiole enlarged between base and apex (fig. 13, *h*); length of petiole 8 to 9 times its maximum width ..... **meteori** (p. 346)
   Petiole not enlarged between base and apex; more than 11 times as long as wide 3
3. Flange at base of petiole broader on dorsal than on ventral side; propodeum with lateral teeth ..... **paya** (p. 348)
   Flange at base of petiole wider on ventral than on dorsal side; propodeum entirely without lateral teeth ..... **immaculata** (p. 350)

CERATOSMICRA DEBILIS (Say)

FIGURES 9, *p*; 12, *m*

Chalcis debilis SAY, Boston Journ. Nat. Hist., vol. 1, p. 271, 1836.—CRESSON, Proc. Ent. Soc. Philadelphia, vol. 1, p. 228, 1862.—HOWARD, U. S. Dept. Agr. Bur. Ent. Bull. 5, p. 36, 1885.

Smicra debilis (Say) WALKER, Notes on Chalcidiae, p. 51, 1871.—CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 37, 47, 1872; Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 375, 1898.

(?) *Spilochalcis debilis* (Say) SMITH, Ann. Rept. New Jersey State Mus. for 1909, p. 649, 1910.

Smicra longipetiola ASHMEAD. Trans. Amer. Ent. Soc., vol. 12, p. x, 1885.—CRESSON, Synopsis of the families and genera of the Hymenoptera of America north of Mexico, p. 233, 1887.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 378, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 35, 1909.

Mischosmicra kahlii ASHMEAD, Mem. Carnegie Mus., vol. 1, p. 251, 1904.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 43, 1909.—GAHAN and FAGAN, U. S. Nat. Mus. Bull. 124, p. 90, 1923.

This species is most easily recognized by the large deep pits on the dorsum of the thorax, the ventral tooth of the propodeum projecting between the bases of the metacoxae, and the very long slender petiole, with the basal flange wanting on the dorsal side, but present on the ventral side.

Description.—Yellowish red to dark brown, with variable dark-brown or black markings, occasional specimens almost entirely without darker markings; vertex and occiput of head, large mesal area of mesopraescutum, all but lateral margins of lobes of mesoscutum, anterior halves of axillae, mesal area of mesoscutellum, apices of metacoxae, outer surface of metafemur except basal, apical, and dorsal spots (fig. 12, *m*), apex of petiole, and transverse dorsal stripes on gaster, usually dark brown or black.

Female: 4–4.5 mm. Apex of antennal scape just attaining level of posterior ocelli; ring segment slightly less than one-fourth length of segment 4, segments 4 to 13 almost equal in length, 12 and 13 often appearing subdivided; scrobe cavity smooth, margined by distinct carinae, the carinae usually double on ventral half; frons minutely shagreened, smooth dorsad of clypeus and between anterior tentorial pits; combined widths of compound eyes equal to interocular space at level of antennal bases; both mandibles with three approximately equal teeth; frontogenal suture straight; diameter of posterior ocellus one-fourth width of interocellar space.

Anterolateral angles of pronotum sharply produced, anterior dorsal margin acarinate; maximum length of mesopraescutum as great as width at widest point; dorsum of thorax coarsely and irregularly punctate, provided with scattering short, white, appressed pubescence; an erect tuft of setae present on each axilla; metacoxae extremely long, slender at apex, uniformly and minutely shagreened; metafemur elongate, outer surface slightly flattened, densely covered with short, white pubescence; ventral margin with 13 to 16 teeth; small sharp inner tooth present; metatibia with apex long, slender, lanceolate.

Propodeum prominently carinate, a small, vertical lamina present at apex on either side of point of insertion of petiole, a sharp, lateral tooth present at each posterolateral angle of propodeum, and a ventral projection extending between bases of metacoxae; petiole as long as metacoxa, surface usually shagreened, the petiole slightly enlarged at apex; basal lamina of petiole present only on ventral and lateral sides; gaster slightly larger than metafemur, acuminate; cerci round, located midway between posterior and anterior margins of epipygium, and placed in a slight depression; ovipositor sheaths provided with minute apical setae.

Male: 4–4.5 mm. Antennal scape (fig. 9, *p*) exceeding level of posterior ocelli; metafemur with inner tooth blunt; petiole slightly longer than metacoxa, and only slightly enlarged at apex; gaster equal to or shorter than metafemur.

Type locality.—Indiana.

Type.—Neotype, female, Delaware, in Academy of Natural Sciences of Philadelphia, E. T. Cresson determination.

The identity of this species has become somewhat confused. Say's type has long since been lost, but Cresson redescribed it in 1872, and as his material is still available I have considered it as fixing the identity of this species. The original description mentions only one structural character, the presence of minute teeth on the propodeum, and this character is present in specimens determined as this species by Cresson. These propodeal teeth are wanting in the specimens determined as this species by Howard and others. Most of the American references to this species are now applied to *Ceratosmicra meteori*, described below.

Types for synonyms: *longipetiola* Ashmead, 41182, U. S. National Museum; *kahlii* Ashmead, 8073, U. S. National Museum.

The types of *S. longipetiola* Ashmead and *M. kahlii* Ashmead differ neither in color nor in structure from the specimens determined as *S. debilis* (Say) by E. T. Cresson.

Host.—Unknown.

Distribution.—Delaware, Florida, Illinois, Iowa, Kansas, Louisiana, Michigan, Minnesota, New York, Pennsylvania, Rhode Island, Texas.

CERATOSMICRA METEORI, new name

FIGURES 9, *q*; 10, *f*; 12, *o*; 13, *h*

Smicra meteori HOWARD (MS. name), Journ. Linn. Soc. London, Zool., vol. 26, p. 131, 1897.

Spilochalcis debilis HOWARD (not Say), U. S. Dept. Agr. Div. Ent. Techn. Ser. Bull. 5, p. 33, 1897.—VIERECK, Connecticut Geol. and Nat. Hist. Surv. Bull. 22, p. 527, 1916.—WASHBURN, 17th Report of the entomologist of Minnesota, p. 193, 1918.—(?) RUHL, Soc. Ent., Stuttgart, vol. 36, p. 11, 1921.

Sayiella debilis ASHMEAD, Mem. Carnegie Mus., vol. 1, p. 251, 1904.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 42, 1909.

Eusayia debilis ASHMEAD, Proc. Ent. Soc. Washington, vol. 6, p. 126, 1904.—BRITTON, Connecticut Geol. and Nat. Hist. Surv. Bull. 31, p. 326, 1920.—GAHAN and FAGAN, U. S. Nat. Mus. Bull. 124, p. 63, 1923.

This species resembles *C. immaculata* (Cresson) in lacking lateral propodeal projections, having fairly slender metafemora (fig. 12, *o*), and having the petiole approximately 10 times as long as wide at the widest point; it differs in having the petiole expanded in the middle (fig. 13, *h*), and the male antennal scape broad from the base to the apex (fig. 9, *q*), rather than broad only at the apex (fig. 9, *s*).

Description.—Pale yellow, with tan, brown, or black markings; markings variable, vertex and occiput of head usually, three dorsal marks on pronotum, broad band extending from apex of mesoscutellum to anterior margin of mesopraescutum (fig. 10, *f*), isolated spot on each lobe of mesoscutum, anterior and posterior margins of axillae, faint markings on outer surface of metafemur (fig. 12, *o*), and usually transverse dorsal bands on gaster, tan, brown, or black.

Female: 4.5–5 mm. Apex of antennal scape just attaining level of posterior ocelli; ring segment one-fourth length of segment 4, segments 4 to 10 equal, last three slightly shorter; scrobe cavity shallow, edge carinate only at ventral margin; interantennal projection with a small carina, this carina usually extending up into scrobe cavity nearly to anterior ocellus, sometimes somewhat shorter; frons laterad of scrobe cavity uniformly covered with large shallow punctures, area ventrad of antennal bases minutely shagreened; width of malar space one-quarter height of compound eye; combined widths of compound eyes slightly greater than interocular space at level of antennal bases; left mandible with two acute teeth, right with three, dorsal one larger and blunt, two ventral ones small, acute, their apices converging slightly; frontogenal suture curved; diameter of posterior ocellus one-half width of interocellar space.

Anterolateral angles of pronotum minutely carinate, anterior dorsal margin acarinate; maximum length of mesopraescutum slightly less than maximum width; parapsidal furrows partly obscured; axillae each with a single row of setae near posterior margin; apex of mesoscutellum provided with a minute lamina; metepisternum conspicuously punctured, setae inconspicuous; surface of metacoxa uniformly shagreened, without setae on outer dorsal side; metafemur (fig. 12, *o*) rather narrow, not flattened on outer side, outer surface sparsely provided with setae, ventral margin with 16 to 20 minute teeth; small inner tooth present; apex of metatibia acute.

Propodeum mostly smooth, minute mesal and apical carinae present, lateral projections wanting; petiole three-fourths length of metacoxa, surface minutely shagreened, a sparse double row of long setae present on either side, basal lamina narrow, not interrupted on dorsal side, petiole markedly expanded in middle (fig. 13, *h*); gaster acuminate, usually one-fourth longer than metafemur; abdominal tergites 4 to 7 each with two or three transverse rows of setae; cerci oval, located midway between base and apex of epipygium; apex of ovipositor sheath minutely roughened.

Male: 3.5–4 mm. Antennal scape broad from base to apex (fig. 9, *q*), apex of scape slightly exceeding level of posterior ocelli, metafemur with 16 to 18 outer ventral teeth, inner tooth sharp; petiole

four-fifths length of metacoxa; gaster slightly shorter than metafemur; ninth sternite slightly flattened near apex.

Type locality.—District of Columbia.

Types.—Lectotype, female, Washington, D. C., 78 [01], October 1886; lectoallotype, Washington, D. C., 78 [01], January 25, 1887, both reared from *Meteorus hyphantriae* parasitic on *Hemerocampa leucostigma:* in the collection of the U. S. National Museum.

In describing his West Indian species *Smicra cressoni*, Howard [18] stated that "it resembles most closely *S. meteori* of the writer's manuscript, reared from *Meteorus hyphantriae* Riley in the District of Columbia." This is practically a description, but does not, in my opinion, validate the name under the International Code. Opinion No. 52 rendered by the International Commission holds that the designation of a type locality does not validate a name, and the host designated in the above quotation is probably attacked by other members of this genus. In the same year in which this manuscript name was published, Howard treated this species under the name *Spilochalcis debilis* (Say), discussed its biology, and figured the adult. As has been remarked on page 346 above, the identity of Say's species had been fixed by Cresson in 1872 and was a different species from this one. The figure and biological notes published by Howard for his identification of *S. debilis* constitute a valid description for this species; therefore, I have used his manuscript name as a new name for *Spilochalcis debilis* Howard, not Say. The most of Howard's material is still in the U. S. National Museum.

Hosts.—*Casinaria orgyiae* (Howard) (Hymenoptera, Ichneumonidae); *Meteorus hyphantriae* Riley, *Meteorus* sp., *Apanteles delicatus* Howard, *Apanteles* sp. (Braconidae).

Distribution.—Connecticut, District of Columbia, Illinois, Louisiana, Maryland, New York, North Carolina, Pennsylvania, Tennessee, Texas, Virginia, West Virginia.

CERATOSMICRA PAYA, new species

FIGURES 9, *r;* 10, *d;* 12, *l*

This small black species with yellow and red spots is much like *Spilochalcis side* (Walker) in habitus, but its long slender petiole refers it to this genus. It differs from all other species in this genus by the extremely wide basal lamina of the petiole, and the metacoxa strongly punctured on the ventral side with the outer dorsal surface strongly shagreened; in *C. debilis* (Say), which this species most closely resembles, the metacoxa is slender at the apex and lacks strong punctures on the ventral side.

[18] Journ. Linn. Soc. London, Zool., vol. 26, p. 131, 1897.

Description.—Black with red, yellow, or white spots; usual color pattern of dorsum of thorax (fig. 10, *d*); color pattern of metafemur (fig. 12, *l*); petiole brown, sometimes darker in middle or at apex; gaster with transverse dorsal black bands.

Female: 4.5 mm. Apex of antennal scape just attaining level of posterior ocelli, ring segment one-fourth length of segment 4; 5 slightly shorter than 4; segments 5 to 10 subequal, last three shorter, ultimate segment blunt at apex; scrobe cavity moderately deep, margin carinate ventrad and on ventral one-third of lateral margins; frons uniformly and densely punctured and covered with long, dense pubescence except for narrow glabrous area dorsad of clypeus; interantennal projection provided with an apical carina, this carina continued dorsad up scrobe cavity nearly to anterior ocellus; width of malar space one-third height of compound eye; combined widths of compound eyes equal to interocular space at level of antennal bases; right mandible with one sharp dorsal tooth and two slightly smaller, acute ventral ones; left mandible with two sharp teeth, dorsal one slightly larger; frontogenal suture straight; diameter of posterior ocellus one-third width of interocellar space.

Dorsum of thorax deeply and thickly punctured, areas between punctures minutely reticulated; anterolateral angles of pronotum strongly carinate; anterior dorsal margin without a carina; mesopraescutum as long as wide at widest point, parapsidal furrows distinct; each axilla with a dense, transverse row of setae; wings covered by minute brown setae; metepisternum deeply pitted, densely covered by long pubescence; metacoxae shagreened on dorsal, inner, and ventral surfaces, but elsewhere covered by large shallow pits, uniformly pubescent except on outer dorsal surface, large rounded projection present at apex on inner side; metafemur (fig. 12, *l*) elongate, outer surface uniformly and densely covered by short pubescence; ventral margin with 18 to 20 teeth; large, blunt inner tooth present, apex of metatibia sharp.

Propodeum conspicuously carinate except on basolateral areas, two strongly projecting teeth present at apex on either side of point of insertion of petiole; petiole five-sixths the length of metacoxa, basal lamina of petiole extremely wide, petiole slightly enlarged near apex, surface entirely glabrous and with only three or four setae on lateral margins; gaster globose, slightly less than length of metafemur; abdominal tergites 3 to 5 without setae, segments 6 and 7 with a few scattered lateral setae; eighth tergite uniformly covered by long white setae; cercus oval, located near anterior margin of epipygium; apex of ovipositor sheath minutely roughened.

Male: 4 mm. Antennal scape (fig. 9, *r*) enlarged near apex; metafemur with 16 or 17 outer ventral teeth; inner tooth distinct, blunt;

petiole equal in length to metacoxa; gaster equal in length to metafemur.

Type locality.—Texas.

Types.—Holotype, female, Dallas, Tex., October 21, 1906, F. C. Bishopp; allotype, male, Los Angeles County, Calif.; paratypes, Peoria, Ill., October 10, 1936, H. E. McClure, 1 male, Manhattan, Kans., October 6, 1934, C. W. Sabrosky, 1 female, Riley County, Kans., September 9, E. E. Faville, 1 female. Holotype, allotype, and one paratype deposited in the U. S. National Museum, one paratype in the Illinois State Natural History Survey collection, and one paratype in the University of Kansas collection.

Host.—Unknown.

CERATOSMICRA IMMACULATA (Cresson)

FIGURES 9, *s;* 12, *n*

Smiera immaculata CRESSON, Proc. Ent. Soc. Philadelphia, vol. 4, p. 97, 1865; The Cresson types of Hymenoptera, p. 75, 1916.

Smicra immaculata (Cresson) WALKER, Notes on Chalcidiae, p. 51, 1871.—CRESSON, Trans. Amer. Ent. Soc., vol. 4, pp. 38, 55, 1872.—DALLA TORRE, Catalogus hymenopterorum, vol. 5, p. 377, 1898.—SCHMIEDEKNECHT, Genera insectorum, fasc. 97, p. 35, 1909.

This minute, yellow species is most easily recognized by its long, slender, and glabrous petiole, the propodeum being entirely without lateral teeth, the glabrous outer dorsal surface of the metacoxa, and the metafemur being entirely without an inner tooth.

Description.—Yellow, occasionally with vague, indistinct darker stains on dorsum of thorax and abdomen; outer surface of metafemur with three small, vague spots (fig. 12, *n*); apical tarsal segments always brown.

Female: 3–3.5 mm. Apex of antennal scape exceeding level of posterior ocelli; ring segment one-third length of segment 4, all flagellar segments approximately equal, stout, covered by white pubescence; scrobe cavity shallow, margined only at ventral one-eighth; frons laterad of scrobe cavity strongly punctate, minutely shagreened ventrad of antennal bases; malar space one-fourth height of compound eyes; combined widths of compound eyes slightly greater than width of interocular space at level of antennal bases; left mandible with two acute teeth, right mandible with three; frontogenal suture faint or obscured entirely; diameter of posterior ocellus one-half width of interocellar space.

Pronotum narrow, without an anterior dorsal carina, slight carina at anterolateral angles; mesopraescutum slightly shorter than width at widest point; dorsum of thorax shallowly punctate, almost glabrous in some specimens, pubescence long and white; posterior margins of

axillae with a few long setae; metacoxae long, outer dorsal surface glabrous, elsewhere minutely shagreened; metafemora (fig. 12, *n*), elongate, not flattened on outer surface, densely covered with short, white pubescence, ventral margin with 15 to 17 teeth, inner tooth wanting; metatibia with long, acute apical spine.

Propodeum almost smooth, vague mesal and apical carinae present, no lateral projections present, spiracular openings vertical; petiole four-fifths the length of metacoxa, glabrous, slightly larger at apex than at base, basal lamina narrower on dorsal than ventral side; gaster slightly shorter than metafemur; cerci oval, large, located slightly nearer posterior than anterior margin of epipygium.

Male: 3 mm. Antennal scape (fig. 9, *s*) broad only at apex; metafemur without an inner tooth, outer ventral margin with 12 or 13 teeth; petiole five-sixths the length of metacoxa; gaster equal in length to metafemur.

Type locality.—Cuba.

Types.—Holotype, female, 1795.1; allotype, male, 1795.2: Academy of Natural Sciences of Philadelphia.

Host.—Meteorus sp. (Hymenoptera, Braconidae).

Distribution.—Texas: Brownsville, ex *Meteorus* sp., E. G. Smyth, 3 males, June 23, 1914, ex *Meteorus* sp., R. A. Vickery, 1 female, December 17, 1910, 2 females; Cameron County, August 3, 1928, R. H. Beamer, 1 female.

EXCLUDED SPECIES

Smicra gigantea Ashmead, Can. Ent., vol. 13, p. 90, 1881.—Dalla Torre, Catalogus hymenopterorum, vol. 5, p. 372, 1898.

This species is a synonym of *Phasgonophora sulcata* Westwood; the type is in the U. S. National Museum.

Chalcis myrifex (Sulzer), Abgek. Gesch. Ins., vol. 1, p. 191, 1776.—Walker, Notes on Chalcidiae, p. 52, 1871.—Cresson, Trans. Amer. Ent. Soc., vol. 4, p. 55, 1872.—Dalla Torre, Catalogus hymenopterorum, vol. 5, p. 380, 1898.

Walker, Cresson, and Dalla Torre list this European species as occurring in North America, but material of this species from Europe proves to be different from all our species.

UNPLACED SPECIES

Smicra bimaculata Strecker, Appendix SS to Report of the Chief of Army Engineers for 1878, p. 1848, 1879.—Bradley, Ent. News, vol. 14, p. 26, 1903.

I have not succeeded in locating the type of this species; it is not in the Strecker collection at the Field Museum, in Chicago, Ill. This species may either be a member of the genus *Chalcis* or belong to the *xanthostigma* group of *Spilochalcis*.

HOST CATALOG

The species of the genus *Chalcis* are larval parasites; all the other species in this tribe that have been reared are pupal parasites.

LEPIDOPTERA

PIERIDAE

Host	*Parasite*
Catopsilia eubule (Linnaeus)	*Spilochalcis eubule* (Cresson)
	Spilochalcis transitiva (Walker)

NYMPHALIDAE

Chlosyne lacinia crocale Edwards	*Spilochalcis phoenica*, new species

LYCAENIDAE

Strymon melinus (Hübner)	*Metadontia amoena* (Say)
Strymon cecrops (Fabricius)	*Metadontia amoena* (Say)
Thecla sp	*Metadontia amoena* (Say)

SATURNIIDAE

Philosamia cynthia Drury	*Spilochalcis mariae* (Riley)
Samia cecropia (Linnaeus)	*Spilochalcis mariae* (Riley)
Callosamia promethea Drury	*Spilochalcis mariae* (Riley)
Telea polyphemus Cramer	*Spilochalcis mariae* (Riley)
Rothschildia sp	*Spilochalcis mariae* (Riley)

NOCTUIDAE

Laphygma frugiperda Abbot and Smith	*Spilochalcis side* (Walker)
	Spilochalcis femorata (Fabricius)
	Spilochalcis igneoides (Kirby)
Plathypena scabra (Fabricius)	*Spilochalcis albifrons* (Walsh) [secondary?]
(?) *Prodenia eridania* Cramer	*Spilochalcis sanguineiventris* (Cresson)
Heliothis obsoleta (Fabricius)	*Spilochalcis femorata* (Fabricius)
	Spilochalcis igneoides (Kirby)

PSYCHIDAE

Thyridopteryx ephemeraeformis Haworth	*Spilochalcis mariae* (Riley)
	Spilochalcis albifrons (Walsh) [secondary?]

LIMACODIDAE

Parasa indetermina Boisduval	*Spilochalcis nigricornis* (Fabricius)
Adoneta spinuloides Herrich-Schaeffer	*Spilochalcis nigricornis* (Fabricius)
Prolimacodes badia (Hübner)	*Spilochalcis nortoni* (Cresson)
Phobetron pithecium Abbot and Smith	*Spilochalcis nortoni* (Cresson)
Limacodes sp	*Spilochalcis nigricornis* (Fabricius)

PYRALIDAE

(?) *Mimorista flavidissimalis* Grote	*Spilochalcis exornata* (Cresson)
Homoeosoma electellum Hulst	*Spilochalcis flavopicta* (Cresson)

Acrobasis sp.	*Spilochalcis flavopicta* (Cresson)
Mineola indigenella Zeller	*Spilochalcis igneoides* (Kirby)

GELECHIIDAE

Gelechia nundinella Zeller	*Spilochalcis dema*, new species
Paralechia pinifoliella Chambers	*Spilochalcis side* (Walker)
Arogalea cristifasciella Chambers	*Spilochalcis albifrons* (Walsh)
Recurvaria piceaella Kearfott	*Spilochalcis side* (Walker)
Gnorimoschema sp.	*Spilochalcis tanais*, new species

EUCOSMIDAE

Ancylis comptana Froehlich	*Spilochalcis flavopicta* (Cresson)
	Spilochalcis albifrons (Walsh)
	Spilochalcis side (Walker)
	Spilochalcis leptis, new species
Ancylis divisana Walker	*Spilochalcis side* (Walker)
	Spilochalcis albifrons (Walsh)
Evetria frustrana Comstock	*Spilochalcis flavopicta* (Cresson)
Polychrosis viteana Clemens	*Spilochalcis albifrons* (Walsh)
Tmetocera ocellana Schiffermuller	*Spilochalcis leptis*, new species

TORTRICIDAE

Cacoecia argyrospila (Walker)	*Spilochalcis albifrons* (Walsh)

PHALONIIDAE

Phalonia sp.	*Spilochalcis flavopicta* (Cresson)

GLYPHIPTERYGIDAE

Choreutis silphiella Busck	*Spilochalcis albifrons* (Walsh)

PLUTELLIDAE

Plutella maculipennis Curtis	*Spilochalcis side* (Walker)
	Spilochalcis albifrons (Walsh)

YPONOMEUTIDAE

Zelleria haimbachi Busck	*Spilochalcis leptis*, new species
Argyresthia thuiella Packard	*Spilochalcis side* (Walker)

COLEOPHORIDAE

Coleophora laricella (Hübner)	*Spilochalcis side* (Walker)
	Spilochalcis albifrons (Walsh)
Coleophora malivorella Riley	*Spilochalcis side* (Walker)
	Spilochalcis albifrons (Walsh)
Coleophora fletcherella Fernald	*Spilochalcis side* (Walker)
	Spilochalcis albifrons (Walsh)
Coleophora salmani Heinrich	*Spilochalcis side* (Walker)
	Spilochalcis albifrons (Walsh)
Coleophora pruniella Clemens	*Spilochalcis side* (Walker)
	Spilochalcis albifrons (Walsh)

LYONETIDAE

Bucculatrix thurberiella Busck	*Spilochalcis side* (Walker)

COLEOPTERA

CHRYSOMELIDAE

Lema trilineata (Olivier)	*Spilochalcis delumbis* (Cresson)
Lema nigrovittata (Guérin)	*Spilochalcis delumbis* (Cresson)
Chlamys plicata (Fabricius)	*Spilochalcis delumbis* (Cresson)
Exema conspersa (Mannerheim)	*Spilochalcis sanguineiventris* (Cresson)
Chalepus dorsalis Thunberg	*Spilochalcis odontotae* Howard

CURCULIONIDAE

Orchestes pallicornis Say	*Spilochalcis side* (Walker)
Phytonomus nigrirostris Fabricius	*Spilochalcis side* (Walker)
Hypera rumicis (Linnaeus)	*Spilochalcis side* (Walker)
Anthonomus grandis Boheman	*Spilochalcis flavopicta* (Cresson)

HYMENOPTERA

ICHNEUMONIDAE

Bathyplectes exigua (Gravenhorst)	*Spilochalcis albifrons* (Walsh)
Angitia plutellae Viereck	*Spilochalcis side* (Walker)
Angitia hellulae Viereck	*Spilochalcis side* (Walker)
Casinaria orgyiae (Howard)	*Ceratosmicra meteori*, new name

BRACONIDAE

Meteorus versicolor (Wesmael)	*Spilochalcis side* (Walker)
Meteorus hyphantriae Riley	*Ceratosmicra meteori*, new name
Meteorus laphygmae Viereck	*Spilochalcis pallens* (Cresson)
Meteorus sp	*Ceratosmicra meteori*, new name
	Ceratosmicra immaculata (Cresson)
Rogas laphygmae Viereck	*Spilochalcis pallens* (Cresson)
Apanteles griffini Viereck	*Spilochalcis albifrons* (Walsh)
Apanteles lacteicolor Viereck	*Spilochalcis albifrons* (Walsh)
Apanteles militaris (Walsh)	*Spilochalcis side* (Walker)
	Spilochalcis albifrons (Walsh)
Apanteles marginiventris (Cresson)	*Spilochalcis hirtifemora* (Ashmead)
	Spilochalcis pallens (Cresson)
Apanteles congregatus (Say)	*Spilochalcis albifrons* (Walsh)
Apanteles delicatus Howard	*Ceratosmicra meteori*, new name
Apanteles atalantae (Packard)	*Spilochalcis albifrons* (Walsh)
Apanteles sp	*Spilochalcis side* (Walker)
	Spilochalcis hirtifemora (Ashmead)
	Ceratosmicra meteori, new name

DIPTERA

STRATIOMYIIDAE

Odontomyia vertebrata Say	*Chalcis canadensis* (Cresson)
Odontomyia sp	*Chalcis barbara* (Cresson)
	Chalcis canadensis (Cresson)

SYRPHIDAE

Mesogramma polita (Say)	*Spilochalcis hirtifemora* (Ashmead)
Mesogramma polygonastyla (Metcalf)	*Spilochalcis hirtifemora* (Ashmead)
Platychirus sp	*Spilochalcis hirtifemora* (Ashmead)

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VITA

Barnard de Witt Burks was born November 12, 1909 in East Las Vegas, New Mexico. He completed the eighth grade in Denver, Colorado, and graduated from Proviso Township high school, Maywood, Illinois, in June 1927. During the following two years he was employed by the R. R. Donnelley and Sons Company of Chicago, as a proof reader. During the school term of 1927-28 he attended evening classes in the Art Institute of Chicago, taking courses in design and lettering. In September 1929 he entered the University of Illinois. During the school terms of 1931-32, and 1932-33 he was employed as a part time Laboratory assistant and Technician in the Department of Entomology. In June 1933, he received the degree of B.A. with high honors in Entomology. The summer of 1933 was spent as a Scout for European corn borers for the Illinois State Department of Agriculture. He entered the Graduate School of the University of Illinois in September 1933. He completed his Master of Arts' Thesis during the summer of 1934 and received his Masters' degree in October 1934. During the school year of 1934-35, he held a service Fellowship in the Department of Entomology, and, the following fall, was appointed Assistant Entomologist in the Illinois State Natural History Survey, which appointment he now holds.

He was elected a member of Phi Beta Kappa and an associate member of Sigma Xi in 1933; he was elected to Phi Kappa Phi in 1936 and to full membership in Sigma Xi in 1937. He is a member of the Entomological Society of America, the Illinois State Academy of Sciences, the Entomological Society of Washington, and an associate member of the American Museum of Natural History.

He has published the following:

"Food Plant Studies on the Chinch Bug," Journal of Economic

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